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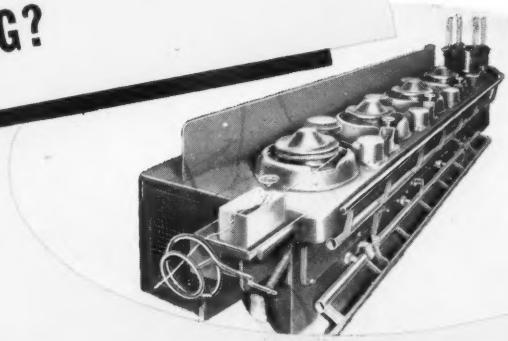

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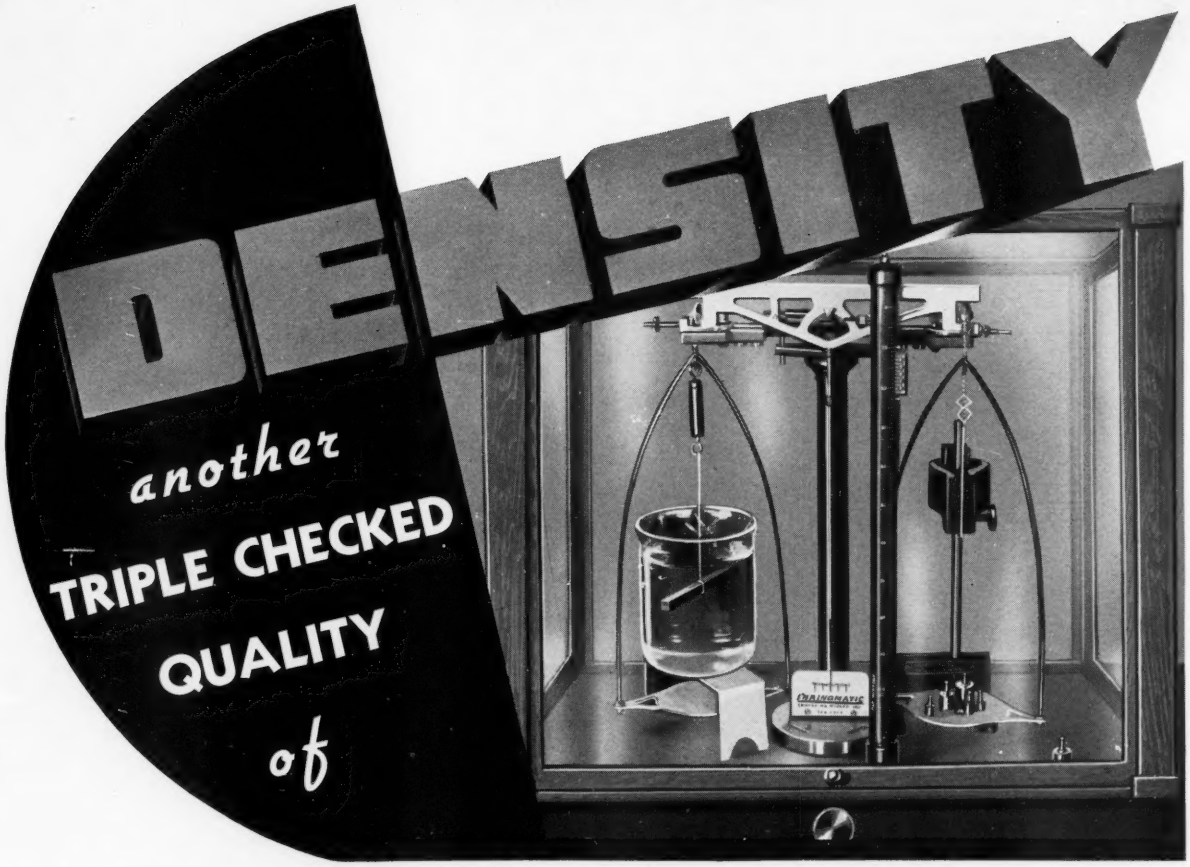

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of the

WIRE ASSOCIATION

At the William Penn Hotel, Pittsburgh, Pa.

Friday, May 21, 1937 at 7:00 P. M.

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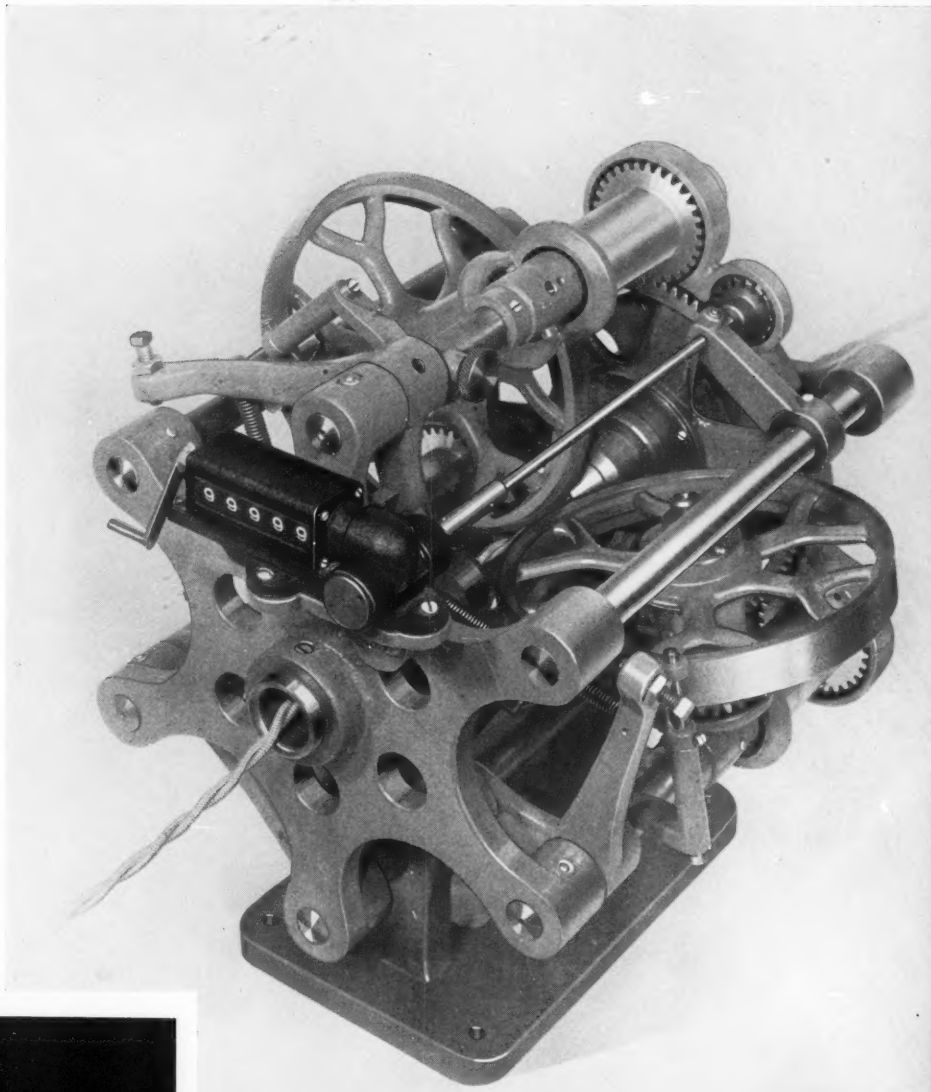

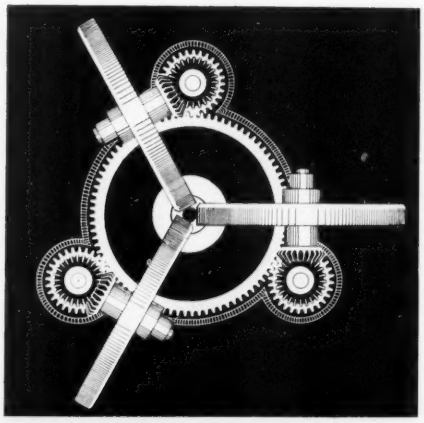

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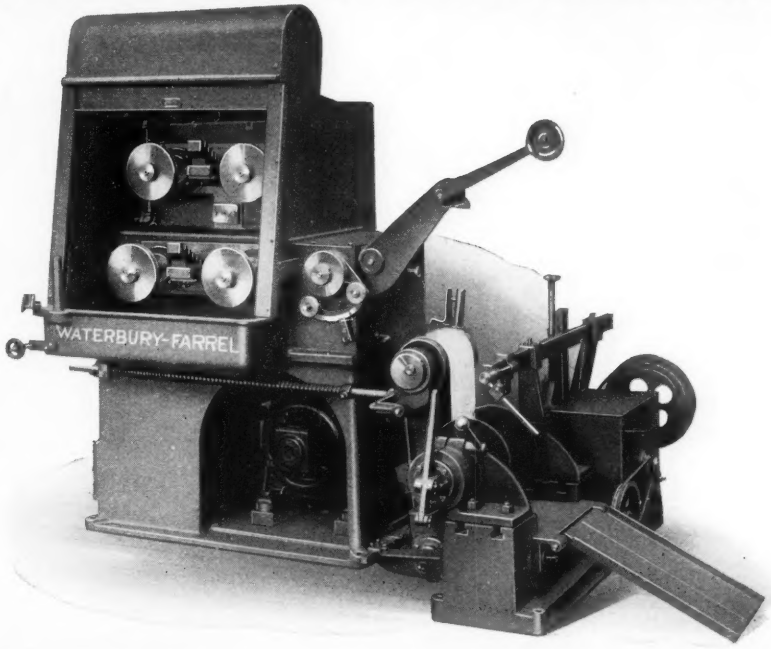

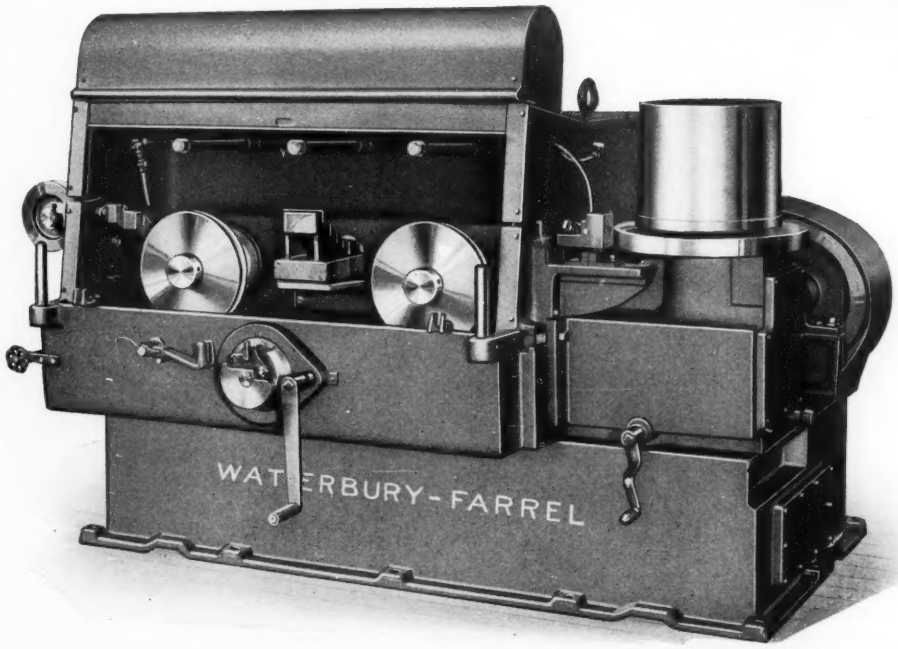

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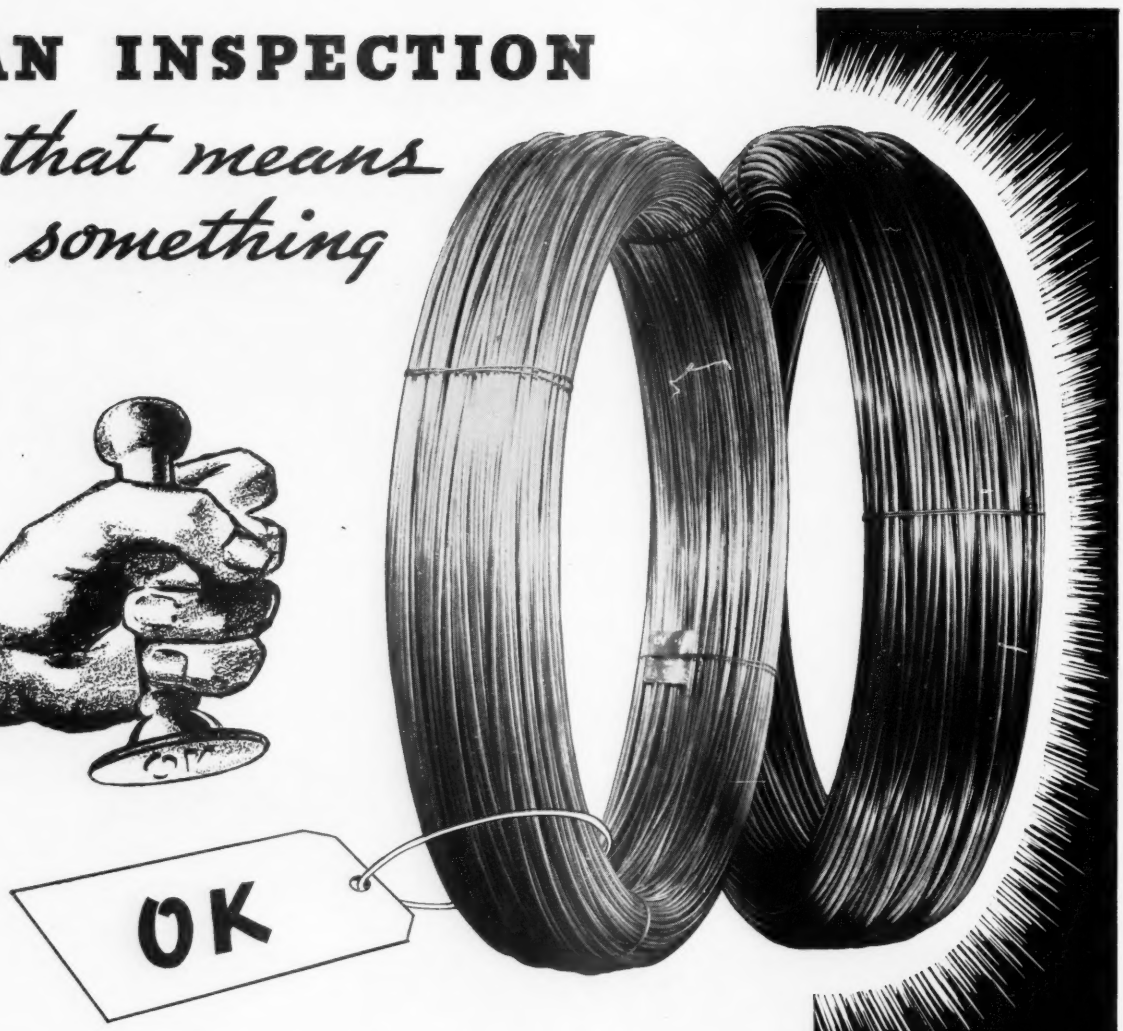

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 12 MAY, 1937 No. 5

Designated as

Official Publication By The Wire Association

Contents

Fatigue Testing of Wire ..... By H. F. Moore 235

Various types of fatigue testing machines for wire are briefly described in this article. Different machines are desirable for testing different sizes of wire and different uses of wire require different types of test to determine service values.

New Republic Steel Corporation Wire Mill at South Chicago 241

Wire on the Farm ..... By J. Kenneth Murray 246

Measuring Spooled Wire — The Lyon Measuring Machine 248

Spring Problems of Yesterday and Tomorrow ..... By J. W. Rockefeller, Jr. 251

A discussion of the development of springs and an estimate of the spring problems still to be solved. The desirability for uniform specifications outlined and suggestions as to how to best set up such specifications.

Wire and Cable in the Aircraft Industry 240

Things Worth Knowing About Nails 254

Method Developed for "Flash" Drying Metal Under Vacuum 254

Rubber Coating Wire Products 255

Stainless Steel Wire in Automobile Wheels 255

Exports and Imports of Wire 256

Outstanding Personalities of the Wire Industry 258

A Review of Recent Wire Patents 259

'Round the World With the Wire Industry 262

Wire Association — Pittsburgh Regional Meeting 266

A.S.T.M. New Standards 275

Index to Advertisers 278

Buyers' Guide 279-280

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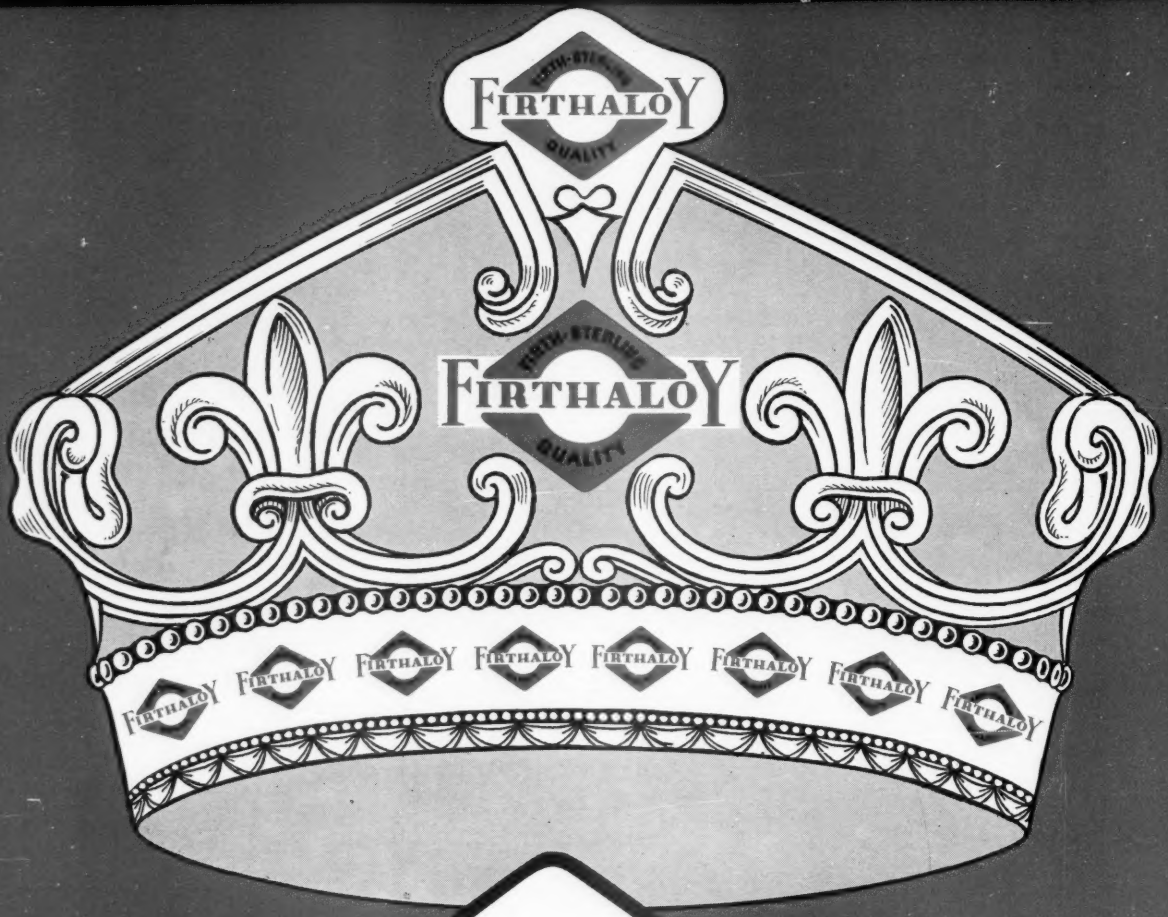

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Vol. 12 MAY 1937 No. 5

Fatigue Testing of Wire

By H. F. Moore

Research Professor of Engineering Materials,
University of Illinois, Urbana, Illinois

Various types of fatigue testing machines for wire are briefly described in this article. Different machines are desirable for testing different sizes of wire and different uses of wire require different types of test to determine service values. ✦

General Considerations

WIRE in service is occasionally subjected to cycles of repeated stress. Common causes of repeated stress include: (1) Pulsating tensile loads on the wire. (2) Repeated flexural loads due to wires passing over sheaves or moving from the sheave to the tangent under temperature changes or other influences. (3) Wire subjected to repeated flexure by sideways swaying of cables. Usually in these cases of repeated flexure the wire is subjected to steady tensile load plus repeated or reversed bending.

✦ ✦ ✦

THE bending stresses are commonly greater than the direct tensile stresses, and, in this connection it will be remembered that if a wire is bent into a circle of radius R, the extreme flexure stress S, in the wire is

$$S = \frac{E\,d}{2\,R} \quad \ldots \quad (1)$$

in which, E=Young's modulus for the material and d=diameter of the wire.

FATIGUE tests of wire have about the same significance as fatigue tests of any metal. Fatigue failure is a fracture — a slowly spreading fracture under repeated cycles of stress. The highest stress which can be applied to specimens of a metal for an indefinitely large number of times without causing fracture is called the "endurance limit", or the "fatigue limit". To determine the endurance limit, several specimens of a metal are subjected to cycles of stresses of different magnitudes, and the number of cycles required to fracture each specimen is noted. Then with stress (S) as ordinates and number of cycles (N) as abscissas, an "S-N" or "stress-cycle" diagram is plotted. It is usually convenient to plot this diagram with stresses laid out to an ordinary linear scale and numbers of cycles of stress laid out to a logarithmic scale.

✦ ✦ ✦

FIGURE 1 shows a typical S-N diagram. The stress at which the S-N diagram becomes horizontal is the endurance limit. The commonest fatigue test is a test under cycles of reversed bending. Fatigue tests are also made under cycles of one-way bending, under cycles of torsion, reversed or one-way, and under cycles of axial stress (tension or compression). Wire cannot well be tested under cycles of reversed axial stress, since it buckles under compression.

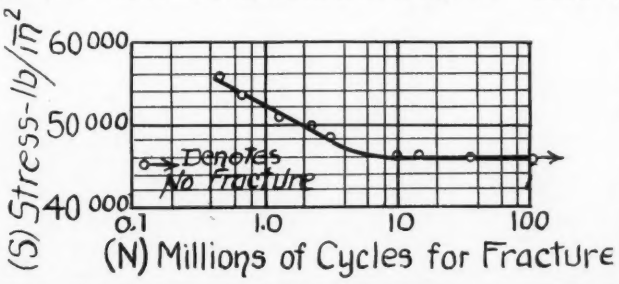

Fig. 1. Typical S-N Diagram. The test results plotted are for specimens of copper-beryllium wire under cycles of reversed flexure. ✦ ✦

Designated as Official Publication by the Wire Association

Difficulties in Making Fatigue Tests of Wire

WHEN making fatigue tests of bar stock, plate metal, billets or castings, test specimens for fatigue tests are machined from a piece of the metal. Figure 2 shows a typical specimen so machined. It will be noted that the specimen has a reduced section at A to insure failure at a distance from the jaws of the chucks or the collets which hold the specimen in the fatigue testing machine. At such jaws there are set up localized stresses in the specimen, and if the specimen were not reduced in section failure would usually be produced at the jaws where these localized stresses (which can not be usually computed) are most intense. The result would be a serious error in value of endurance limit. The limit determined would be too low.[1] In the specimen shown in Fig. 2 the reduced section is carefully polished, usually longitudinally, so that the surface condition is as perfect as possible.

✦ ✦ ✦

NOW in making a fatigue test of wire it is usually undesirable to reduce the section of the specimen. For small wires (say 0.1 inch in diameter or less) accurate machining and measurement of the reduced section is difficult. Moreover in testing wire it is important to keep the surface of the wire intact, so that such factors as decarburization, surface condition, etc. may play their part in determining test results for specimens of wire, just as they do in determining load-carrying capacity of wire in service. Special machines are necessary for fatigue testing of wire—machines for so loading and gripping the specimen that failure will not occur at a point where there is high localized stress.

✦ ✦ ✦

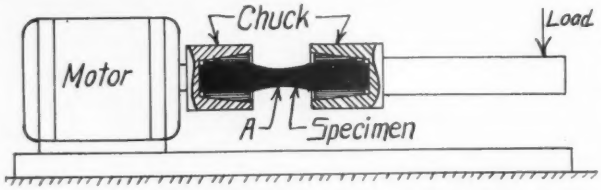

Fig. 2. Machined Specimen for Fatigue Tests of Plate, Shape or Bar Material or for Castings. The specimen is shown in a rotating-beam fatigue machine of the cantilever type. The machine has ball bearings in the motor and under the load so that the torsion of the specimen is negligible. The specimen is subjected to cycles of reversed flexure. ✦ ✦

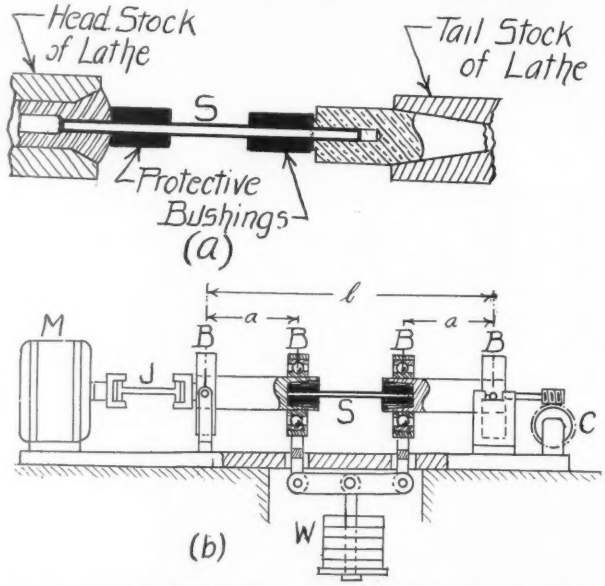

Fig. 3. Fatigue Specimen of Wire with Protective Bushings. Specimen is shown in place in rotating-beam fatigue testing machine. The machine is fitted with ball bearings so that the torsion in the specimen is negligible. The specimen is subjected to cycles of reversed flexure. ✦ ✦ ✦

FIVE types of fatigue tests for wire will be briefly described; (1) Rotating-beam (reversed flexure) tests using specimens with protective bushings, (2) Rotating-beam (reversed flexure) tests of long specimens on the Shelton-Swanger machine, (3) Reversed flexure tests of specimens of wire bent round a sheave on the DeForest machine, (4) Reversed flexure tests of long specimens buckled by axial compression and rotated round the axis of the wire on the Haigh-Robertson machine, and (5) Reversed flexure tests of rotating specimens bent into a circular arc and rotated about the axis of the wire on the J. N. Kenyon machine. In addition to these reversed flexure tests there are given brief notes on torsion fatigue tests of wire and on repeated tension fatigue tests.

✦ ✦ ✦

Fatigue Specimens With Protective Bushings

FIGURE 3 shows a fatigue specimen of wire with protective bushings on those parts of the specimen which are to be gripped by the machine jaws. Low melting metals such as type metal and Wood's metal have been successfully used for such bushings.[2] For flexure tests of copper wire the writer has found bushings of insulating fiber or of one of the stronger plastics satisfactory. The specimen is first made in the form shown in Fig. 3 (a). It is held in a lathe as shown and the bushings turned true. The specimen of wire made need not be absolutely straight. Figure 3 (b) shows this specimen, with the projecting ends cut off, as it is placed in a rotating-beam fatigue machine.[3] In the special machine shown the bending

[1] Tests made in 1932 in the Fatigue of Metals Laboratory, University of Illinois by F. E. Hangs and D. M. Lee showed that for rotating-beam specimens without reduced section the computed endurance limit varied from 56 to 81 per cent of the endurance limit determined from specimens with reduced section. The lower percentage was for cold-rolled and for heat-treated alloy steel. The upper value was for flange steel.

[2] F. C. Lea and J. Dick, "Torsional Fatigue Tests of Cold-drawn Wires," Proceedings, (British) Inst. of Mechanical Engineers, Vol. 120, p. 661 (1931).

E. E. Weibel, "The Correlation of Spring-wire Bending and Torsion Fatigue Tests," Transactions, Am. Soc. Mechanical Engineers, Vol. 57, p. 501 (1935).

moment along the length of specimen equals $\frac{W\,a}{2}$, and the extreme fiber stress equals

$$\left(\frac{W\,a}{2}\right) \div \left(\frac{\pi}{32} d^3\right)$$

in which the length a is shown in Fig. 3 (b), W is the total weight hung on the specimen and d is the diameter of the specimen.

✦ ✦ ✦

DURING each revolution of the testing machine the stress passes through a cycle of completely reversed flexure. In this machine, as in all fatigue testing machines, a speed counter is provided to indicate the number of cycles, and an automatic stop is provided which acts when the specimen breaks.

✦ ✦ ✦

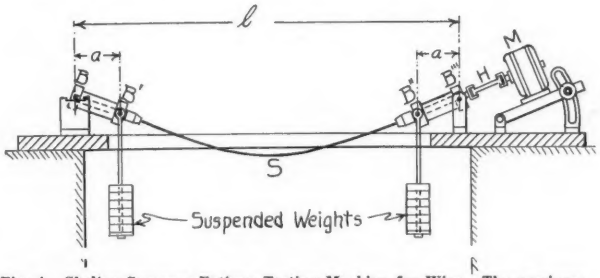

Fig. 4. Shelton-Swanger Fatigue Testing Machine for Wire. The specimen S is approximately 60 inches long. Bearings B, B', B'' are ball bearings so that the torsion on S is negligible.

✦ ✦ ✦ ✦

THIS method of flexural fatigue testing of wire, has not, to the writer's knowledge, been very thoroughly tried out on high strength wire, but it has been found fairly satisfactory for wires of medium hardness and soft wire. It is doubtful whether fiber bushings could be used for torsional fatigue tests of wire.

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Shelton Swanger Rotating-Beam Fatigue Testing Machine for Wire[4]

FIGURE 4 shows the rotating-beam used by Messrs. Shelton and Swanger in studying the fatigue strength of wire under cycles of reversed flexure. This machine is a rotating-beam testing machine, in which a long specimen S is used. In the tests reported the span l was about 60 inches. The jaws of the machine in the housings B B' and B'' B''' are fitted with collet chucks which take the wire specimen without machining. The collet is lined with a copper or paper bushing. The wire specimen rotates about its own axis like the flexible shaft of a dentist's drill, and when the machine is running properly appears to stand still when viewed from a short distance. The principle of the machine is that the dead weight of the specimen itself will set up appreciable flexural stress at the mid-length of the specimen away from the collets. Thus the maximum flexural moment is at mid-length of span and is made up of the moment Wa due to the weights plus the moment $\frac{W_1 l}{8}$ due to W_1 the weight of the wire specimen. It is found that when the specimens run smoothly fracture occurs near this mid-point of the specimen. In this machine the formula for the maximum flexural stress set up is as shown in Table A on next page.

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IN using this machine two precautions are necessary. The specimen must be very nearly straight. This usually involves some permanent bending of the wire in order to straighten it after it is unrolled from a coil. The specimen must run without serious vibration, and its plane of flexure should lie in a vertical plane. There are usually several critical speeds at which the specimen will tend to rotate, not about its own axis, but an axis between the jaws of the machine. It is a matter requiring some care to see that the specimen is run properly.

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IN the Shelton-Swanger machine, and in the ordinary rotating-beam machine using a specimen with protective bushings, the tests are continued under what is known as "constant stress" conditions. Stress is set up by definite weights and these definite weights "follow up" any deflection of the specimen. The shape of the curve which the specimen takes is not used as a basis for computing stress. The next three machines which will be described are of the type which are known as "constant strain" machines. In this type of machine the deflection, the minimum radius of curvature, or some other deformation measurement is used to compute the stress in the specimen. Young's modulus (modulus of elasticity) for the wire must be known or determined. When the minimum radius of curvature is so used, equation (1) can be used to compute maximum stress.

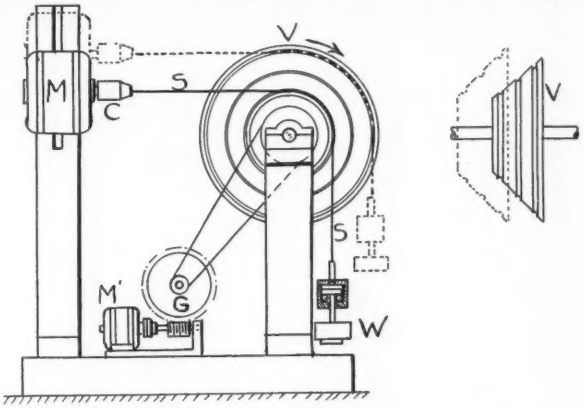

Fig. 5. DeForest Fatigue Testing Machine for Wire.

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IN a constant strain machine there is no "follow up" of deflection by forces, and if the specimen tends to deform permanently the stress diminishes slightly as the test proceeds. Usually, however, as the endurance limit is ap-

[3]A description of a variety of testing machines may be found by reference to Circular 23, University of Illinois and in the report of the American Society for Testing Materials, Committee on Fatigue of Metals, 1930, Proceedings, A. S. T. M., Vol. 30, Part I, pp. 261-270.

[4]See Research Paper, R. P. 754, Journal of Research, National Bureau of Standards, Vol. 14, January, 1935.

TABLE A

$$S=\frac{M_1+M_2}{I/c}=\left(\frac{W_2a}{2}+\frac{W_1l}{8}=\frac{W_1b}{2}\right)\div\frac{\pi}{32}d^3$$

in which

S=maximum flexural stress, pounds per square inch.

M_1=bending moment (in inch-pounds) due to weights and supports=$\frac{W_2a}{2}$

M_2=bending moment (in inch-pounds) due to weight of specimen=$\frac{W_1l}{8}+\frac{W_1b}{2}$, note $\frac{W_1b}{2}$ is small

W_1=total weight of specimen, pounds

l=horizontal distance from face of one grip to face of the other, inches

W_2=total force due to suspended weights + effective load due to weight of supports, pounds

a=horizontal distance from bearing blocks to line of pull of weights, inches

I/c=section modulus of specimen, for a circular specimen this is $\frac{\pi}{32}d^3$ (inches)

b=horizontal distance from face of grip to point of support

d=diameter of specimen in inches

proached these two types of machines give results nearly alike, although the constant strain machine usually gives endurance limits slightly higher than those given by a constant stress machine.

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The deForest Reversed-Flexure Fatigue Testing Machine for Wire[5]

IN this fatigue testing machine the bending stresses in the wire are produced by bending it through 90 degrees over a sheave of known radius. Reversals of this bending stress are then produced by rotating the wire in the grooves of the sheave. This arrangement is shown in diagram in Fig. 5. A motor M is provided with a chuck C in which one end of the wire specimen S is inserted. The wire is then led over a sheave as shown, and at its free end there is suspended a weight W just sufficient to keep the wire straight. The sheave V is driven at a speed of about 5 r.p.m. in the direction shown. As the wire rotates in the groove of the sheave it is lubricated with a high grade motor oil saturated with colloidal graphite. The machine has been used at speeds as high as 3000 r.p.m. When the specimen breaks the dropping of weight W opens a switch and stops the motors.

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TO get definite stresses definite diameters of sheaves are used and this is brought about by placing various grooves on a cone. It is possible to move the motor M vertically and the cone horizontally to make the adjustments for using the different grooves. The radius of the curvature of cross-section of each groove in the sheave is made slightly larger than the radius of the wire to be tested. The advantage of this machine is that wire can be used in it without special straightening and the speed of testing is high. A disadvantage is the necessity of a large number of sheaves with different diameters and different radii of curvatures of grooves. Strictly speaking the stress cycle is not a complete reversal but varies between $\left(\frac{W}{\pi/4d^2}+\frac{Ed}{2R}\right)$ and $\left(\frac{W}{\pi/4d^2}-\frac{Ed}{2R}\right)$

The weight W is supported by a ball thrust bearing so that it does not rotate.

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THIS machine belongs to the constant strain type of machine because the bending stresses are not dependent upon loads but upon the radius of curvature to which the wire specimen is bent.

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The Haigh-Robertson Reversed-Flexure Fatigue Testing Machine for Wire

THE principle of this machine is shown in Fig. 6. The motor driving a specimen of wire is pivoted about a point P directly under the jaws of the chuck which holds the wire. The other end of the rather long wire specimen B is fitted into a socket which carries a steel ball which in turn bears against three steel balls in the tail stock of the machine. In starting a test, the specimen is put in place straight along the line PB and a small flexure is given the test piece by a slight motion of the tail stock. The motor M pivots around the point P so that the angles which the wire makes at P and B are equal. The motor is then started and by hand or by guides the specimen is held so that it does not vibrate while the speed rises through any critical ranges between zero and full speed. When the wire is running smoothly at full speed the flexure of the wire

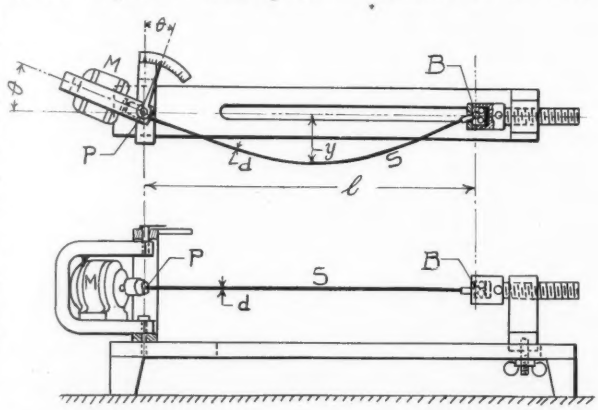

Fig. 6. Haigh-Robertson Fatigue Testing Machine for Wire. ✦ ✦

[5]A. V. deForest and L. W. Hopkins, "The Testing of Rope Wire and Wire Rope," Proceedings, Am. Soc. Testing Materials, Vol. 32, Part II, page 398 (1932).

is increased by screwing up the tail stock bearing until the wire takes the form shown in Fig. 6. This is the form of a pin-ended long column. It is a sine curve and the radius of curvature together with the bending moment and flexural stress are greatest at the mid-length of span well away from the chucks. The angle of flexure θ is read directly and the stress is given by the equation.

$$S = \frac{\pi\theta Ed}{2l}$$

in which

S=max. flexural stress, (lb. per sq. in.)
E=Young's modulus for the material (lb. per sq. in.)
d=diameter of the wire (in.)
l=length of specimen (in.)
θ=angle shown in Fig. 6, measured directly in radius (1 radian=57.3 degrees)

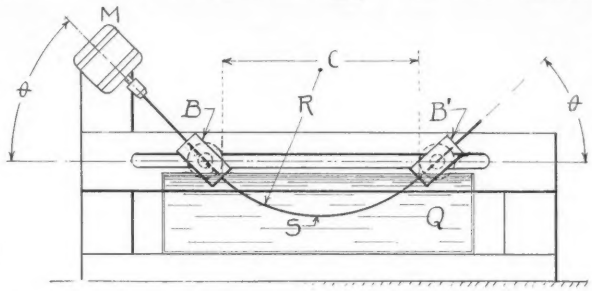

Fig. 7. J. N. Kenyon Rotating-arc Fatigue Testing Machine for Wire.

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IN this machine it is necessary to have the specimens of wire straightened. This introduces some possibility of change in the properties of the wire due to cold work. The machine is very rapid in operation, being capable of operation at 10,000 r.p.m. It is a constant strain type machine.

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J. N. Kenyon's Rotating-Wire Arc Fatigue Machine[6] (Reversed-Flexure)

THIS machine was specially designed for testing rather small wire, as shown in diagram in Fig. 7. The specimen of wire is held at one end by a chuck in a motor M which can be inclined at any desired angle. From this chuck the wire specimen S extends in a straight line through a bearing B which is inclined to the horizontal at some definite angle θ, and is locked in that position. The wire specimen then extends in an arc through the oil bath Q and through a second bearing B' which is inclined to the horizontal at an angle of $(180° - \theta)$, and is also locked in position. The wire is free to move lengthwise in both these bearings which are usually made of Babbitt or some other soft bearing material. In long rotating specimens of wire vibration may cause trouble, and this Mr. Kenyon minimizes by running the wire specimen in a bath of oil. The specimen S bends into a circular arc between bearings, with uniform bending moment for its entire length, and for specimens of piano wire, cold drawn steel wire and copper wire there has been found no effective localized stress in the edges of the bearings probably due to the supply of a sufficient lubricant to form a film around the rotating wire. The specimens usually break between bearings.

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WITH angle of inclination of bearings θ, the radius of curvature R of the wire specimen is

$$\frac{C}{2 \sin \theta}$$

in which C is the horizontal chord length between bearings B' and B'', as shown in Fig. 7. The extreme fiber stress S is then $\frac{Ed}{2R}$ in which E is Young's modulus (modulus of elasticity) and d is the diameter of the wire.

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IT should be noted for both the Haigh-Robertson machine and the Kenyon machine that a careful determination of modulus of elasticity of the wire is essential. It should be further noted that if a **composite** wire is tested in flexure the effective modulus of elasticity for measuring stress is quite different from the modulus of elasticity which would be obtained for composite wire in a tension test. The determination of the modulus of elasticity of a composite wire under flexure is rather complicated, and space is lacking for its discussion in this paper. The effect of a bath of oil in damping vibrations and possibly raising the endurance limit in other ways, demands further study. The Kenyon machine requires the wire specimen to be straightened before running a fatigue test. This machine seems especially adapted to testing small wires in reversed flexure.

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Testing Machines for Repeated Tension and Torsion of Wire

FATIGUE tests of wire under axial stress obviously cannot be tests in which stress is reversed from tension to compression, since wire buckles under compression. Repeated-tension tests can be made either on the Haigh electro-magnetic machine[7] or on a tension fatigue machine mechanically operated.[7]

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SINCE it is undesirable to reduce the section of a wire specimen the question of grips for a tension fatigue specimen is of prime importance. For gripping the specimen the device shown in Fig. 8 has been in successful use by Messrs. Shelton and Swanger. A is a screw block screwed to the head of the testing machine. C is a collet chuck using a copper-lead bushing B[8].

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THE end of the specimen S is threaded and a nut screwed at the end. When the specimen is pulled up tight the tension is

[6]For a fuller description of the Kenyon machine and a fuller statement of the theory of its action see Proceedings of Am. Soc. Testing Materials, Vol. 35, part II, p. 156 (1935).

[7]See previous reference to 1930 Report of A. S. T. M., Committee on Fatigue of Metals.

[7]See previous reference to Circular 23, Eng. Expt. Sta., Univ. of Illinois.

[8]S. M. Shelton and W. H. Swanger, "Fatigue Properties of Steel Wire," Research Paper R. P. 754, Journal of Research, National Bureau of Standards, Vol. 14, January 1935.

carried partly by the nut N and partly by friction grip. The end of the wire which goes into the grips is polished and any coating such as galvanizing is removed. The surface improvement by polishing adds more strength than is taken away by the slight reduction of area in polishing.

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TORSION tests of wire have been made using protective bushings of some low-melting alloy. In torsion fatigue machines repeated or reversed twisting moment is usually applied to the specimen by means of a crank and connecting rod, and the twisting moment is measured either by the twist of a calibrated steel bar, or by the angle of oscillation of a fly wheel vibrated back and forth by the specimen[9].

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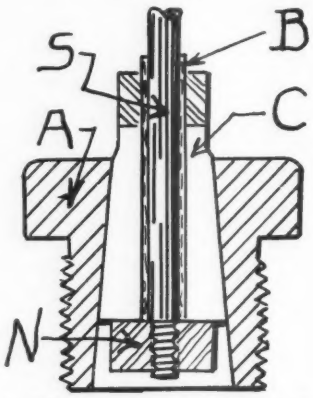

Fig. 8. Shelton-Swanger Grip for Tension Fatigue Specimen. One block A screws into the lower head of a repeated-tension fatigue testing machine, and a similar block screws into the upper head.

Conclusion

VARIOUS types of fatigue testing machines for wire have been briefly described in this article, and there are other machines which have not been described here. No one of the machines described can be picked out as "best." Different machines are desirable for testing different sizes of wire, and different uses of wire require different types of test to determine service values.

[9]See previous reference to the work of Lea and Dick, to that of Weibel, to the 1930 report of the A. S. T. M. Committee on Fatigue of Metals, and to Circular 23, Engineering Expt. Sta., University of Illinois.

Wire And Cable In The Aircraft Industry

THE ever-increasing importance of wire and wire products in the broadening field of air transportation is reflected in a survey conducted by United Air Lines, revealing that nineteen and a half miles of electric wire was required for its new $3,000,000 fleet of twelve-ton, three-mile-a-minute Mainliner transports. These de luxe ships have just been placed in non-stop service between New York and Chicago and will shortly be flying on the overnight coast-to-coast schedules.

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ON board these Mainliners is the most elaborate electrical setup in the history of the nation's air transportation system. Never before has the matter of aircraft wires been as important as it is in 1937. Electrical operation of the major instruments, new lighting features, electric appliances that were unheard of in the early air line days have given aircraft engineers new problems to deal with.

28 of these "Mainliners" are being placed in service on the New York-Chicago-Pacific coast airways. Each plane is powered with 2 14-cylinder Wasp engines developing 1150 horsepower each with a cruising speed of 190 m.p.h. and a top speed of 212 m.p.h. with a full load of 21 passengers and cargo.

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ALL electric wire for the 28 Mainliners was supplied by Packard Electric Corporation of Warren, O., and each ship has 3677 feet of electric wire as shown in table A.

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EQUALLY important in these air liners were the control cables, which were supplied by the Macwhyte Company of Kenosha, Wisconsin. These cables lead from the control column in the pilots' compartment to the wing and tail group controls. Each cable is painted a different color to simplify inspections by the ground personnel. At the Douglas Company factory on the Pacific Coast, where the Mainliner fleet was constructed to United's specification, thorough tests were conducted on all control cables and wires. Exhaustive ground proof tests and actual flight tests were run before the proper cables were decided upon.

Table A

Gauge	Length (Ft.)	Weight (lbs.)
00	71	29.75
0	10	3.30
2	11	2.82
4	2	.25
6	234	22.11
8	81	5.15
10	37	1.65
12	89	2.73
14	521	9.74
16	1353	20.29
18	675	8.10
20	593	5.93
TOTAL	3677	111.82

(*Please turn to page 274*)

New Republic Steel Corporation Wire Mill At South Chicago

Description of the Layout, Equipment and Production Methods.

THE new wire mill built by Republic Steel Corp. at South Chicago was formally opened on April 27th when a group including more than 100 agricultural engineers, farm leaders, editors and industrialists visited the plant which has been designed to meet the special needs of rural markets that bought four billion pounds of fence and wire in 1936.

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THE results of long research by electrical, chemical, metallurgical, mechanical and civil engineers have been pooled in this modern mill, one of the outstanding features of which is a huge electro-galvanizing unit that coats as many as 578 miles of fence wire with 27 close-knit layers of pure zinc in a single day.

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CONTROLLED by automatic electrical devices which insure uniform quality in the manufacture of plain and electrically zinc-coated wire, barb wire, woven wire fence, and nails, the mill is served by high-speed mechanical handling equipment that expedites continuous production throughout an area of 177,000 square feet.

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Rod Yard

THE Rod Yard has a capacity of 2,800 gross tons, and is served by a 96-foot span, five-ton, double tilting hook, high speed crane. Steel racks for piling rod coils six high, on edge, in individual lanes are provided to facilitate storing, handling and classification of rods.

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A BROADSIDE transfer conveyor, holding thirteen rod lifts of 3,600 pounds each, is located near the center of the yard, and is used to convey the rods directly into the cleaning house. This conveyor is operated by the cleaning house craneman from an electric push button located convenient to the crane cab.

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Cleaning House

THE cleaning house building is of acid-resisting construction throughout, and employs a number of entirely new features, including the use of glass brick in place of the customary windows. It is serviced by a specially designed five ton roller-bearing crane.

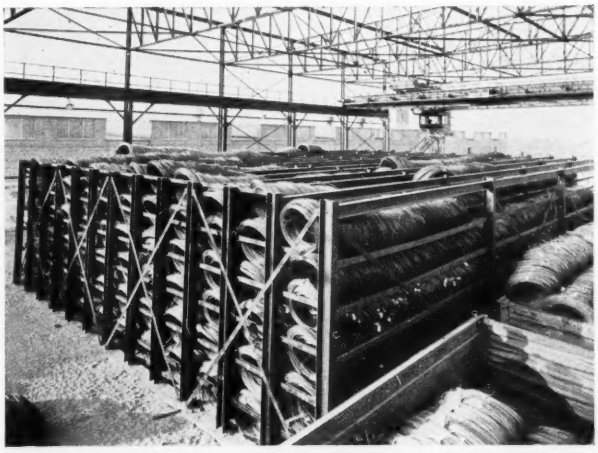

Fig. 1. Rod coils delivered to Republic Steel Corp.'s new wire mill by rail are transferred to the storage racks by a 5-ton high-speed crane with double tilting hook, which operates on a 96-ft. span. A siding extends alongside the 2800 gross ton rod yard underneath the crane span. ✦

THE cleaning line consists of three reinforced concrete, acid-proof brick lined cleaning tanks, one rinse tank, three sull tanks, and three lime tanks of the following dimensions.

Cleaning Tanks: Two tanks 10′0″ wide x 25′0″ long x 7′0″ deep
One tank 10′0″ wide x 10′0″ long x 7′0″ deep
Rinse Tank: 10′0″ x 10′0″ x 7′0″ deep
Sull Tanks: 10′0″ wide x 25′0″ long x 7′0″ deep
Lime Tanks: 5′0″ wide x 10′0″ long x 7′0″ deep

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ACID is stored in two 8,000 gallon capacity tanks and is fed by gravity to two measuring tanks. The cleaning tanks are heated by means of jets, and spent acid is discharged from the tanks by a syphon in each tank.

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RINSING is accomplished by means of spray nozzles controlled by a balanced valve which is operated by placing a yoke of rods in the rinsing position.

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SULLING tanks are provided with special vertical sprays to give proper mist conditions.

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LIME tanks are steel insulated, and are heated by means of steam jets with automatic temperature control. A circulating pump provides necessary agitation.

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Rod Baker

A MODERN two-lane rod baker, indirect natural gas fired, with automatic temperature

control, is located between the cleaning and wire drawing departments. Bakers are of steel panel construction with four inches of rock wool insulation. Heated air in each lane is circulated at the rate of about 10,000 C. F. M.

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THE rods are advanced through the baker on conveyors, similar in design to that in the rod yard. After a lift of rods is deposited on one of the conveyors outside of the bakers by the cleaning house crane, the crane operator presses an electric push button which automatically opens the vertical doors at each end of the baker, advances the conveyor one step, and closes the doors until next operation of push button. In the event the baker line is full, this same button operates a warning bell indicating that fact.

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THE rods are removed from the discharge end of the conveyor by an electric lift truck, on a specially designed demountable ram, and are delivered to a ram rack immediately behind the wire drawing machines. At this point the rod coils are butt welded for continuous drawing without rethreading of the wire drawing machines and are flipped direct from these demountable rams to the wire drawing machines. The arrangement of conveyors and controls makes the operation of the cleaning house nearly automatic.

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Wire Drawing Department

THE wire drawing equipment consists of eleven wire drawing machines, as follows: Three continuous machines for four, five, or six draft wire; four continuous machines for three draft wire, and four double deck machines for one and two draft wire.

THESE machines are designed for high speed, with variable speed, 230 volt D. C. motors and full magnetic dynamic braking control on each block. All motors and blocks are self-contained and air cooled. Machines will handle up to 400 pound bundles. Continuous pointers are used. The five-hole machines have a rating of 112.5 available horse power, and a drawing speed of 1000 to 1400 feet per minute on sizes Nos. 13 to 16 gauge from a No. 5 rod. These machines are equipped with sixteen or twenty-two inch diameter interchangeable finishing blocks.

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THE three-hole machines have a rating of 90.0 available horse power, and a drawing speed of 850 to 1250 feet per minute on sizes Nos. 11 to 12½ gauge from No. 5 rod. These machines are equipped with twenty-two or twenty-four inch diameter interchangeable finishing blocks.

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THE double deck machines have a rating of 45.0 available horse power, and a drawing speed of 287 to 861 feet per minute on sizes ⅜ inch to No. 10½ gauge. Finishing blocks are 24 inch diameter.

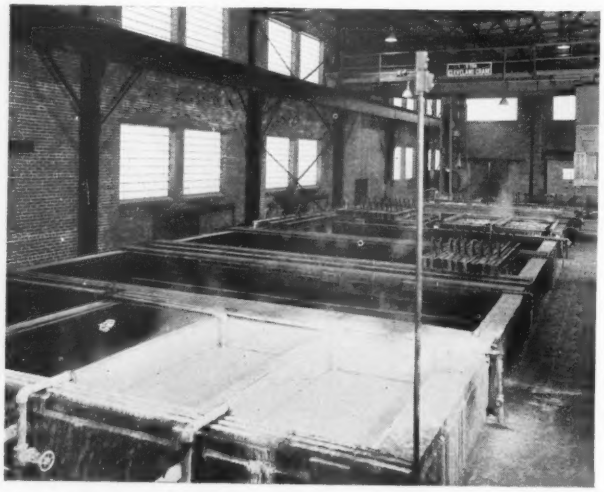

Fig. 2. Glass block has been used in the cleaning house of the Republic Steel Corp. wire mill at South Chicago. A 5-ton roller bearing crane carries coils of rod through the cleaning tanks, rinse tanks, sull tanks and lime tanks on a hairpin hook, which picks the rod up as it enters the rear of this room over a 25-ton broadside transfer conveyor. This crane delivers the rods directly to the baker.

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WATER cooled tungsten carbide dies are used on all wire drawing machines.

SEVEN one-ton, 16′0″ span tramrails, and one-ton, rigid arm hoist with push button control, having a lifting speed of 35 feet per minute, service the wire drawing machines. The hoists are equipped with collapsible spiders for stripping the wire drawing blocks. After the blocks have been stripped the wire is deposited on corrugated steel skids on which specially designed racks, having a capacity of 6,000 pounds of wire, have been built.

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SKIDS are transferred from the wire drawing department into the process storage or finishing departments by means of an electric lift truck.

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Electro-Galvanizing

THIS department has been provided with electro-galvanizing equipment in which the most recent achievements of electro-chemistry, metallurgy and industrial engineering have been combined to provide a continuous unit which is approximately 500 feet, from end to end. It is equipped with 80 payoff reels to facilitate continuous operation on the electro-galvanizing line, which has a capacity of 40 strands of wire. Coils transferred from the wire drawing or storage rooms on skids by electric lift trucks are placed on the payoff reels by two tramrail hoists.

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AFTER normalizing in a pot of molten lead, as in hot galvanizing, the wire is allowed to cool and passes over sheaves into the cleaning tanks which extend for a distance of 70 feet. The wire passes first through a hot alkaline bath which removes all surplus dirt; then through a water rinse and into the pickle tank where remaining surface impurities are attacked by acid. After another rinse, minute particles still present in the pores and structure of

the steel which might prevent a perfect bond are eliminated by passing the wire through an electrolytic flash cleaner, which etches the surface to provide for firm adhesion of the zinc coatings. After another rinse and a final acid dip it then passes through a final rinse into the electro-galvanizing tank. Large rollers hold the strands beneath the surface of the successive solutions and they are kept in line by porcelain sleeves on dividing walls between the various tanks.

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THE electro-galvanizing tank is 140 feet long, 6 feet wide and 2 feet deep. It requires approximately 43,000 gallons of special galvanizing solution, which circulates in the direction opposite to that of wire travel, passing through filters, three 10,000 gallon settling tanks and a cooling tower. Thirty tons of zinc anodes are immersed in this solution in the bottom of the electro-galvanizing tank as the wires, which function as cathodes, pass through it a little below the surface of the solution as speeds ranging from 35 to 70 feet per minute, depending upon the coating to be applied. The character of the special electro-galvanizing bath makes it possible to deposit 27 successive, even coatings of zinc 99.9% pure upon the copper-bearing steel wire at current densities up to 1500 amperes per square foot, without developing either pores or pits.

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THE wire passes out of the tank with its coating already dense and bright. It is merely dipped into a cold rinse to remove adhering solution from the galvanizing tank, then into a hot rinse to remove any final traces and to heat the wire so that, when it enters the air, for winding on the take-up reels, any remaining water will dry quickly. With the coating thickness determined by the flow of current and speed at which the wire passes through the tank, the operator merely sets the speed of the reels and the rheostats of the generator circuits to a setting specified for each desired coating, to insure a uniform, even deposit on the wire.

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THE takeup frame consists of three separate units, two of these units having fourteen 22-inch blocks each, and one unit twelve interchangeable 16 or 22-inch blocks. Each of these units is separately driven by variable speed motors.

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Nail Department

THE nail making equipment consists of four sets of fourteen machines, or a total of 56 machines, producing a complete range of sizes.

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THESE machines are serviced by six one-ton tramrails, equipped with one-ton hoists, which handle the wire from skids to reels directly behind the machines. Machines are belt-driven from roller bearing equipped lineshafts located in tunnels underneath the main aisles, each set having a separate lineshaft. This arrangement eliminates unsightly overhead belts and lineshafts, facilitates the oiling of shafts and servicing of belts, and in addition eliminates the shadows which are caused by overhead equipment, thus allowing for a closer adjustment of the machines and better inspection of product.

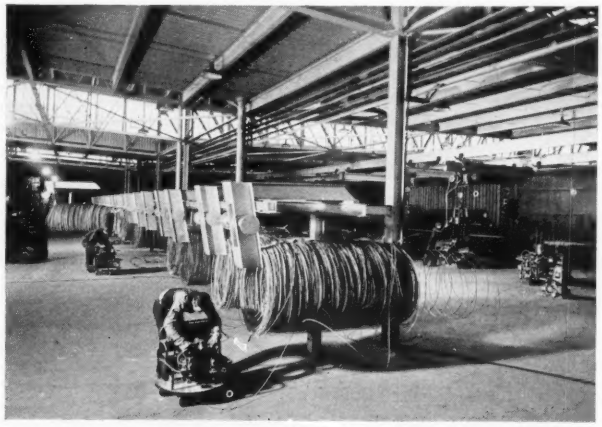

Fig. 3. Portable electric welders are employed to joint coils of rod end to end for continuous drawing in the new Republic Steel Corp. wire mill at South Chicago. This operation is illustrated in the left foreground where welders work alongside the Republic-designed demountable rams on which rods are carried by electric lift trucks from the bakers to the drawing rack.

THE finished nails are dropped into inspection pans and accumulated on nail carts having a capacity of 1,000 pounds each. These carts are equipped with a rigid type of bale which allows them to be picked up by a one-ton monorail cab operated hoist, without floor assistance, and carried to the nail tumbler charging floor where the hoist operator weighs these carts on a floor type dial scale and then wheels them to the tumblers.

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THE tumbling equipment consists of nine tumblers, each with a capacity of forty kegs per charge. These tumblers are individually driven by a ten horse power motor through a herringbone gear reducer. Nails are discharged from tumblers to the packing floor where kegs are filled and weighed, and, after heading, are delivered to the warehouse by means of a conveyor. These filled kegs are stocked by means of a pallet - fark - lift - truck method.

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Lead Annealing

THIS department consists of a gas fired, two - lead - pan-unit, with automatic temperature control, and one twelve-spindle takeup frame equipped with twenty-two inch diameter blocks for four hundred pound coils. The product of this unit is processed into bale ties.

✦ ✦ ✦

Bale Ties

THE equipment in this department consists of two bale tie machines with bundling attachment, and has a size range from No. 9 to No. 17 gauge in all standard lengths from seven to sixteen feet. Each machine will have a production capacity of eight bundles per hour, each bundle consisting of 250 bale ties. These machines are designed for single loop bale ties and will produce either round or oval loops.

Field Fence Department

THE field fence department consists of three woven field fence machines, and one poultry fence machine. Machines are of the wrap-stay type. The production range of these machines is as follows: All No. 9 gauge fence, including No. 9 gauge top and bottom; No. 11 gauge fence with No. 9 top and bottom; No. 12½ gauge fence with No. 10 gauge top and bottom; standard heights, twenty or forty rod rolls, and either six inch or twelve inch stays. The poultry fence machines produce No. 14 gauge fence with No. 11 gauge top and bottom, and No. 15½ gauge fence with No. 12½ gauge top and bottom, all six inch stays, ten or twenty rod rolls. The operating speed on all machines is 120 stays per minutes.

✦ ✦ ✦

Barb Wire

THE equipment in this department consists of fifteen machines, twelve of which are for two-point cattle or hog and three for four-point cattle or hog. A special four slide machine has been provided for making wire reels for the barb wire.

✦ ✦ ✦

THE nail and barb wire departments are equipped with two gasoline tractors, one of which is of the low lift, and the other a tier lift type.

✦ ✦ ✦

Electrical Features

IN deciding upon the electrical equipment for the new wire mill, only the types that would give a high degree of reliability with low maintenance costs were selected. An example of this is cited in the motor selections. Line start, three phase motors were used where possible. In the cleaning room, on conveyors and door lifts, high torque line start induction motors fully enclosed with acid proofed windings and ball bearings were used. Cast iron switch cases and control housings with gasketed doors were also selected for use in this locality where acid fumes are so damaging to electrical equipment.

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TOTALLY enclosed ball bearing line start induction motors were selected for pointer and hoist motors in the drawing room to prevent lime dust from causing frequent cleaning of rotors.

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INDUCTION motors were used throughout the entire nail mill. Individual motor drive on the nail tumblers were used instead of line shaft drive with clutches for each tumbler. With the exception of one motor, all starting equipment in the nail mill is of the line start type, push button operated.

✦ ✦ ✦

MACHINES requiring smooth acceleration and large speed ranges were equipped with direct current motors. Examples of these are found in the continuous wire drawing machines, galvanizing and patenting take-up frames, rod storage and cleaning room cranes.

✦ ✦ ✦

THROUGHOUT the entire mill an observer will note the almost total absence of electrical control apparatus on the operating floors. All important concentrations of electrical control are either found in the tunnels or on elevated platforms, leaving the floors for process material movements free from obstruction by control apparatus.

✦ ✦ ✦

DIRECT current supply, for the first time in any steel and wire mill in the Western Hemisphere, is furnished by a mercury arc rectifier, having automatic voltage control by means of electrically energized grids. This 1,000 K. W. rectifier is connected to the D. C. bus through a high speed breaker. The bus is a nine-inch copper channel one-half inch thick, mounted on special insulators and steel beams in the upper part of the connecting tunnels below the mill floors. This bus is at present the largest section of this type ever rolled. It was selected for strength and ease of installation. It is provided with expansion joints at proper intervals and carries D. C. power through the important distribution centers instead of bringing board Circuit breakers for remote conters are tapped to this bus in the tunnel. The wire drawing machine control panels are mounted in the tunnel under the machines and adjacent to the bus. Voltage is maintained at load center of this bus by bringing two pressure wires from load center back to the rectifier voltage regulator in the power substation.

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IN the substation are located the mercury arc rectifier for D.

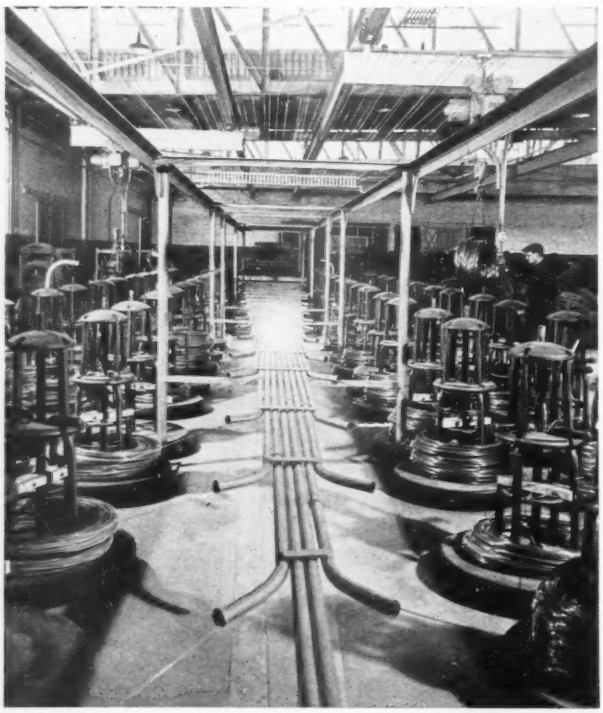

Fig. 4. Forty wires travel simultaneously through these sheaves of metal tubing as they move from pay-off reels into the lead annealing furnace at the start of the 500 ft. electro-galvanizing line in Republic Steel Corp.'s new South Chicago wire mill. The wires cool in passing overhead to the batter of cleaning tanks and a 120-ton electro-galvanizing unit.

✦ ✦

C. conversion, transformers for three phase power, and the steel clad cubicle switchgear for high tension distribution.

✦ ✦ ✦

THE transformers are of a recently developed type in which inflammable and explosive oil used for cooling is replaced by a non-inflammable, non-explosive material. Losses are slightly lower in this transformerd than in conventional types.

✦ ✦ ✦

POWER and lighting transformers in the new wire mill represent the first installations of this type in the Chicago area. The steel clad cubicle switchgear distribution center located in the substation represents the latest in this type of equipment, the oil circuit breakers being of 250,000 KVA interrupting capacity, push button operated, battery trip. Ample provision for growth of the wire mill is included in the switchgear installation. At present it consists of six important circuits as follows: one incoming line with 2,000 ampere circuit breaker, two 1,200 ampere, and three 600 ampere feeder circuits leaving the cubicle.

✦ ✦ ✦

THE electro-galvanizing setup includes six motor-generators, the two flash cleaners being small sets with 20 H. P. driving motors and the four plating M. G. sets having 220 H. P., 2,300 volt three-phase synchronous motors, and 20,000 ampere 7-volt generators. Special 20,000 ampere shunts were built to furnish the necessary voltage drop for operating, recording, and indicating ammeters at the control station.

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THE control station in the galvanizing department consists of control push button stations for starting and stopping all M. G. sets, circulating pumps and take-up frame motors. Rheostats are located here for control of current output for the M. G. sets and speed of the take-up frames. Feet per minute of wire drawn through the plating bath is recorded on electrical tachometers mounted on the control station board. Indicating voltmeters and ammeters are mounted on the individual motor-generator control panels. Recording ammeters are mounted adjacent to the tachometer recorders. These recording instruments give the wire mill superintendent a constant check upon the entire galvanizing operation.

✦ ✦ ✦

LIGHTING throughout the mill is supplied from a bank of transformers located centrally to load in a vault connecting with the main tunnel under the mill floor. Three phase, four wire distribution to the various lighting panels leaves this vault. The latest type of high power voltage fuses protect these feeders and are mounted adjacent to the transformers. Intensities in the drawing room are approximately twelve-foot candles, cleaning room ten-foot candles, warehouses five-foot candles, galvanizing eight and fourteen-foot candles, and nail mill twelve to fifteen-foot candles.

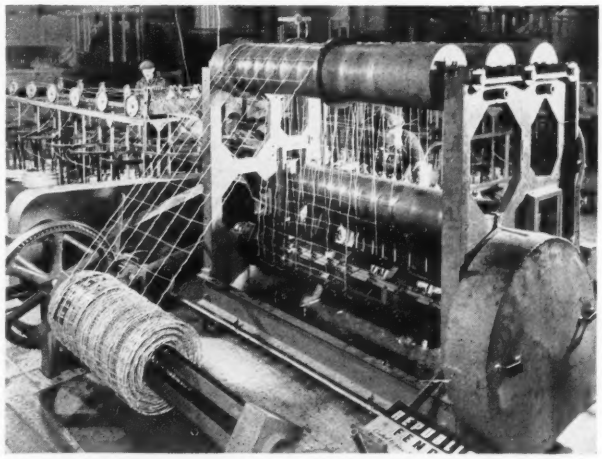

Fig. 5. One of a battery of machines now turning out woven wire fence to meet the special needs of agricultural markets, in the new Republic Steel Corp. wire mill at South Chicago.

✦ ✦ ✦ ✦

APPROXIMATE footage of principal electrical materials used in the new mill is as follows: Conduit, all sizes totals 55,000 feet, four-inch being largest size used; transit conduit 14,750 feet, principally three and one-half inch size in ten foot lengths for present and future underground feeder circuits to new wire mill; six hundred volt wire and cable 185,000 feet, 6,000 feet of this being 500,000 circular mill size, and 6,368 feet of three-conductor 600,000 circular mill varnished cambric and lead 3,000 volt cable.

✦ ✦ ✦

Features of Building Construction

THE wire mill occupies a total area of 177,000 sq. ft., including the outside crane runway yard, which is used for rod storage. This is 100 x 200 ft.

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THE mill occupies a site just north of the corporation's steel plant and rod mill, a short distance east of the Calumet River. It is flanked on the north and south by railroad sidings; one on the south for delivery of rods to the rod storage yard where the track passes directly beneath the transfer conveyor for unloading, and one on the north to serve at 325 ft. loading dock. Both connect with the Pennsylvania R.R. and the Indiana Harbor Belt R.R. Truck loading facilities are provided at the east end of the warehouse area, which is situated adjacent to the nail, fence and barbed wire departments.

✦ ✦ ✦

A CLEAR span of 100 ft. has been provided in the wire drawing, process storage, electro-galvanizing, fence, barbed wire and nail departments and the ware-

(*Please turn to Page 247*)

Wire On The Farm

By J. Kenneth Murray,
Sales Division, Republic Steel Corp.,
Chicago, Ill.

Discussion of numerous uses of wire and wire products on the modern farm. ✦ ✦

IT was late Friday afternoon. Bill Hinton, Wire salesman for the Perfect Wire Company, had finished his weekly trip on the road. He was a bachelor and lived alone at a club in the city. The weather was very hot and he was reluctant to start the return trip. The country was beautiful at that time of the year and he was wishing he could remain there over the week-end. Several ideas came to him—one of which he thought was a very good one. Why not stop at one of these farms and offer to trade his services on the next day for some good farm food. It had been many a day since he had enjoyed the hospitality of a farm home and furthermore it would give him an opportunity to check up on the uses of wire and wire products on the modern farm. He knew many farm items were made of the wire he sold to manufacturers in the city, so now to see these in actual service would be a reward for his efforts. He had already seen miles of fence and telephone wire, so he could check these items off at once (2).

✦ ✦ ✦

DRIVING leisurely along the road he came across Farmer John Stubble at the corner of one of his wheat fields near the road. After introducing himself he got busy outlining his proposition to the farmer, who was cradling out the corners of the field, preparatory to the real job of reaping it on the morrow. As the services of this husky young fellow would be most welcome for tomorrow's task, Farmer Stubble replied "Young fellow, I like your looks and guess you're okay. We can use you here tomorrow and my wife can arrange to supply you with some of the good food you're hoping for. But I can't for the life of me see how you expect to find any wire on this farm except yonder fence."

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AS dusk was approaching they started for the farm house. On the way, Stubble stopped to fix a grape vine which had blown from its fastening. "What's that you're tying it with?" asked Hinton. "By cracky, a piece of wire,—I remember I bought these at the hardware store especially for the vines," replied Stubble. That was item (3) made of wire. Later, as they passed the pig sty, Stubble called his attention to the rings in the pigs' noses. These were made of copper coated wire and Hinton smiled as he checked off item (4). As Stubble unhooked a wire screen door hook (5) from a wire screen door (6) and they entered the house they found Mrs. Stubble taking a swing at a fly with a swatter made of screen (7) with a wire handle (8). Farmer Stubble introduced Hinton to his wife and she quickly and hospitably agreed to Hinton's proposition. She excused herself, saying she wanted to get through with her work as quickly as possible. Opening the oven door, she removed several bread baking pans which had wire rims (9). These pans had been resting on wire racks (10) in the oven.

J. KENNETH MURRAY

Born in Pittsburgh, Pa., 1901. Five years in the Purchasing and Stores Department, B&O Railroad Company. Three years assistant sales manager Premium Metal & Packing Co., Pittsburgh, Pa. Three and one-half years sales and mill application Tungsten Carbide Dies. Went with Republic Steel Corporation June 1st, 1933 and now engaged in sales and development work in connection with wire, wire products and tack departments.

✦ ✦ ✦

WHEN Stubble and his wife started to the barn to do the milking, Hinton wanted to try it also. They handed him a pail with a wire rim (12) and a stainless steel wire straining screen (13), in the pouring spout. These screens prevented rust where they came in contact with the milk acid, and were therefore very good for that purpose. Hinton here reminded his host that he had counted 13 items already and that he was pleased at finding so many items made of wire and wire products. Stubble admitted that there were probably more wire items than he had ever noticed, while he proceeded to feed the cows their ration of chopped fodder, using a basket with a wire handle (14). He hung the basket on a wire nail (15) when he had finished feeding.

✦ ✦ ✦

THE milking finished, the men carried the milk back to the springhouse, while Mrs. Stubble

stopped to feed a healthy flock of chickens which she kept restrained in an enclosure of poultry wire netting (16). This wire was galvanized for resistance to corrosion.

✦ ✦ ✦

AGAIN in the house, Stubble, at his wife's request, emptied a large sack of flour into the flour bin. The sack had been tied with a wire fastener, (17). Mrs. Stubble had been using a flour sifter made with wire screen, wire agitators and a wire handle. These three items brought Hinton's total to (20).

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THEY enjoyed the very pleasant meal Mrs. Stubble prepared, using knives made from wire (21). The left over food was returned to the refrigerator where it rested on wire shelves (22).

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LATER they all sat down in the parlor where the conversation drifted from wire used on a farm, to Hinton's answering questions about the city. Hinton, when he saw his chance, injected a remark about the springs in the upholstery (23) the curtain rods (24) and the lamp shade frames (25).

✦ ✦ ✦

AFTER a pleasant evening's conversation, Mrs. Stubble's suggestion about a can of beer and a sandwich, met with the hearty approval of her husband and their guest. The can was quickly and neatly opened with a wire opener (26).

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BEING reminded by his host, of the hard day's work ahead, making it necessary to arise at four thirty A. M., Hinton was shown to the guest room, where he made use of a wire garment hanger (27) some wire coat hooks (28) and soon the house was quiet and dark. He enjoyed his night's rest on a set of wire springs (29) and a spring filled mattress (30) and was up and ready when he was called at four thirty A. M.

✦ ✦ ✦

AFTER partaking of a real farm breakfast, they were soon at their task in the fields. That day they handled many sheaves with forks, the tines of which were made of wire (31). As the combine reaper ran along, the threshed straw was put into a baler, the forks used for this were equipped with wire racks (32) enabling them to handle a much heavier load. The baler used 3 baling wires to each bale (33). Farmer Stubble acknowledged the baling wire and was quick to admit the many uses for reclaimed baling wire around the farm.

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AFTER a very strenuous day's work, to say nothing of Hinton's blistered hands, the men retired early without much conversation. Sunday dawned brightly and Hinton arose with pleasant thoughts of a restful morning, a good breakfast and dinner in prospect and later an enjoyable trip to the city, after the heat of the day had passed.

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LATER Hinton accompanied Stubble on the Sunday inspection trip around the farm, during which a farmer usually stands in quiet meditation of the things he soon must do. On this tour, Stubble discovered item (34) when he mentioned the check rower wire on his planter. As they returned to the house, Hinton noticed that Mrs. Stubble was hanging some dish towels on a line made of galvanized wire (35).

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LATE in the afternoon, having been served a chicken dinner which surpassed any of Mrs. Stubble's previous culinary efforts, Hinton reluctantly bid his hosts goodby. He said he hoped his services on the previous day had partly repaid for their hospitality, and invited them both to be his guests in the city for a week-end. They agreed to come to see him. Before leaving. he recounted that he had found 35 items of wire on their farm. Taking a final chance to banter Farmer Stubble as the car moved out of the lane, Hinton called back, "You have the address, WIRE me when you can come."

New Republic Steel Corp. Wire Mill at South Chicago

(*Continued from Page 245*)

house. Due to the presence of high-speed cranes, monorails and tramrail hoists throughout the plant, 100 ft. roof trusses of special strength were provided.

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APPROXIMATELY 1,200 lineal feet of sub-floor tunnels have been provided to accommodate electrical controls and driving equipment for the wire drawing and nail machines. Removal of these facilities from the production floor further facilities free-flowing operations provided by the clear aisles.

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CONCRETE floors have been provided throughout the mill and are supported on a 9 ft. fill of slag, which was required by the previous swampy condition of the site. A metal roof deck, 1¾" deep, covered by ½" of special insulation, has been employed throughout most of the plant.

✦ ✦ ✦

IN the cleaning house, where glass block was installed in place of conventional sash, due to the presence of corrosive acids, the roof is of book tile, supported on structural T's. Structural steel throughout the cleaning house is ⅜" minimum thickness. Protected metal ventilators and blowers have been installed here and above the electro-galvanizing tanks to insure adequate ventilation.

Make Your Plans Now to Attend
THE ANNUAL
WIRE ASSOCIATION MEETING
AND CONVENTION
To Be Held
In Association With The
NATIONAL METAL CONGRESS
At ATLANTIC CITY, N. J.
OCTOBER 18th to 22nd, 1937

Measuring Spooled Wire

The Lyon Measuring Machine

BACK in the "good old days", when business went along in a more leisurely fashion, and competition wasn't so keen as it is now, penny items were always six for a nickel, and there were thirteen doughnuts to the dozen. But the storekeeper eventually learned that 100 extra pennies make an extra dollar, and the baker found out that the thirteenth doughnut made a sizable hole in net profits.

✦ ✦ ✦

ONLY sellers of wire and rope and similar products where exact linear measurement has heretofore been difficult, if not impossible, to secure by any method speedy enough to be practical, still continue the neighborly—albeit unprofitable—practice of giving a "baker's dozen."

HARRY LYON

President, Lyon-Vail Machine Company, Inc., Brockton, Massachusetts.

✦ ✦ ✦

THE problem of measuring off, say, 250 feet of wire, and being sure that the spool contains exactly 250 feet—no more, no less—is one that has long confronted the wire industry.

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VIBRATION and slippage, enemies of accuracy, are potential factors which must be given careful consideration when mechanical measuring devices are employed. Particularly is this true in handling twisted pair and other irregular shapes; and in using one machine to measure a variety of sizes and products.

✦ ✦ ✦

IN guarding against the danger of short measure, many sellers are inclined to measure off a few extra feet to the spool, as an allowance for error. Even when this is not done, slippage in measuring may result in the buyer receiving a "bonus" in footage—the extra doughnut to the dozen which eats into profits.

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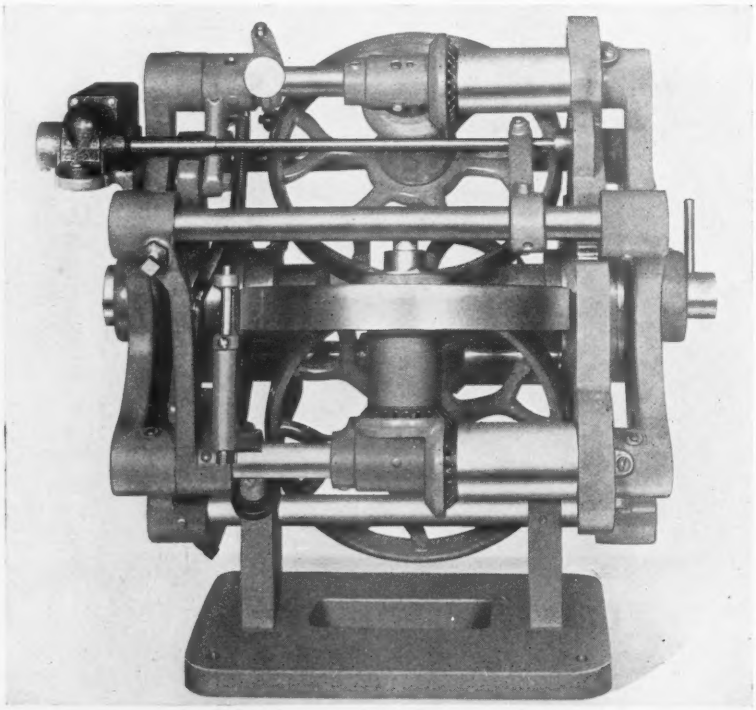
LOSSES through inaccurate measurement undoubtedly vary greatly with the type of product.



THE LYON MEASURING MACHINE

employs an exclusive patented principle of construction which results in extreme accuracy of measurement, and permits high operating speeds.

It is estimated that with the industry as a whole they run somewhere between ½% to 2% of the measured output.

✦ ✦ ✦

THE figures seem insignificant. Even a 2% loss means only an extra five feet per 250-foot spool of wire. In dollars and cents, however, those extra five feet per spool represent an out-of-pocket loss of salable material worth $20,000 on a million dollars of business.

✦ ✦ ✦

THE need for an accurate, speedy mechanical means of measuring wire and other flexible material sold or used by linear measure came to the attention of Harry Lyon, consulting engineer and inventor of precision machines employed in a number of industries. The result was a distinctly new type of measuring machine, adaptable to a wide range of sizes and materials, accurate in every application, and capable of operation at any speed or at variable speeds.

✦ ✦ ✦

WHILE characteristically simple in construction, the Lyon measuring machine employs a mechanical principle new in its application to measuring. In reality, it consists of three measuring machines in one. The Lyon machine employs three measuring wheels, each one using the other two to support the wire, and all geared together.

✦ ✦ ✦

THE material being measured runs in an equilateral triangle, or three V's, formed by the surfaces of the measuring wheels, and maintained for any size or shape of material. The faces open together to accommodate larger sizes, and close for smaller. This action is controlled by the size of the material itself; correct, uniform tension being maintained by a common spring action.

✦ ✦ ✦

THE "three-V" contact of measuring wheels on material eliminates slipping and permits accurate measurement not only of ordinary single wire, but of twisted pair and odd-shaped products. It also makes the machine vibrationless in operation at any speed, even on twisted stock.

✦ ✦ ✦

WITHOUT adjustment, the standard model will handle bare, insulated or armored wire, twisted pair, oval, angular or odd-shaped wire and cable, and even belting, rope and flexible tubing, from .040″ to 1″ in diameter, at any speed practical for handling the material being measured. Exact measurement is shown on a quick-set counter within full view of the operator.

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BATTERIES of the latest model Lyon machine have recently been delivered to a number of concerns in the East, and larger machines employing the same basic "three-V" measuring principle, capable of handling large sizes of cable, are being made in the Brockton, Massachusetts, plant on special order. Recent improvements in the machine give added accuracy and adaptability, although earlier models under the basic patents have been in use for several years in plants of foremost wire producers.

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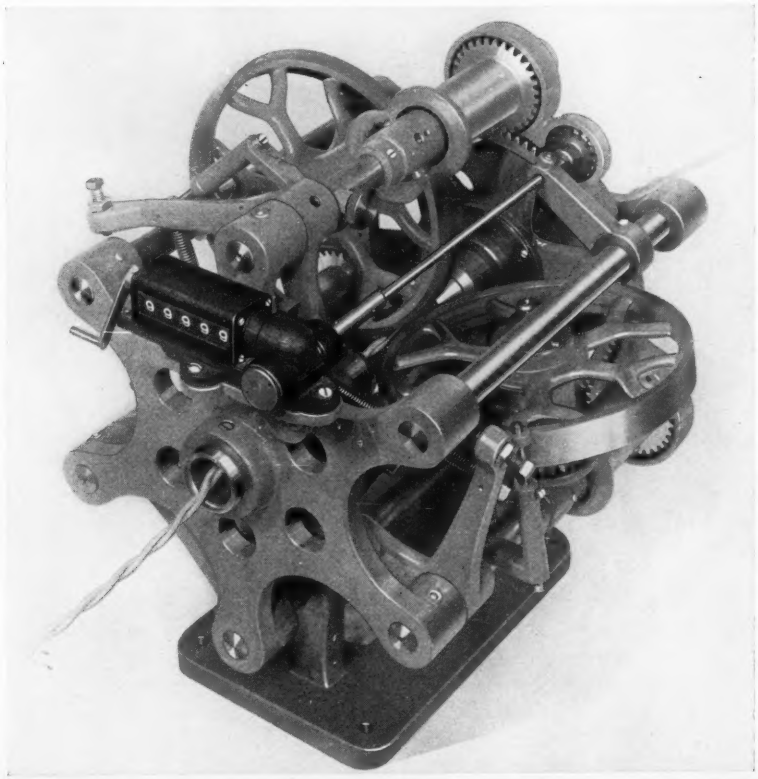
IT is said that the extreme practical accuracy of the Lyon machine permits measurement so exact as to entirely eliminate the ½% to 2% loss heretofore deemed necessary, while operating speeds can be stepped up to a maximum without fear of slippage, vibration or error in measurement.



EXCLUSIVE "3-V" CONSTRUCTION

of Lyon Measuring Machine enables it to handle twisted pair and irregular shaped wire and cable, as well as bare and insulated wire, without vibration and at maximum speed. ✦ ✦ ✦

IF WIRE HAD FINGER-PRINTS

—*but* wire does leave finger-prints—not in lines, loops and whorls, but in figures in your production cost book. • Look at your production costs. Do they present evidence that the wire you are using is uniform — that you are manufacturing your products at lowest possible cost? • If there is any doubt in your mind, it will be well worth your while to investigate Republic Wire. Ordered from standard stock or made special to rigid specifications, the finger-prints left by Republic Wire are evidence of high uniformity in analysis, gauge, strength, temper, fabricating qualities and finish. • Write for further information and quotations.

REPUBLIC STEEL

WIRE

Basic Open-Hearth and Bessemer {Annealed, Regular, Hard Drawn, Sul Coated, Bright, Extra Bright, Copper Coated, Liquor Finish, Galvanized}, Spring Wire, Enduro Stainless Steel Wire, Toncan Iron Wire, Cold Heading Wire, Wire Rods.

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SPRINGS AND WIRE PRODUCTS

Devoted to Products Made Wholly or in Part of Wire, Rod, Strip and Cold Drawn Steel.

J. W. Rockefeller, Jr., Section Editor.

Vol. 12 MAY, 1937 No. 5

Spring Problems of Yesterday and Tomorrow

By J. W. Rockefeller, Jr.,
Consulting Engineer, New York, N. Y.

A discussion of the development of springs and an estimate of the spring problems still to be solved. The desirability for uniform specifications outlined and suggestions as to how to best set up such specifications.

TWENTY years ago the inventor of a mechanism which is commonplace today, approached the engineering department of one of the outstanding electrical manufacturing concerns of this country. The mechanism depended upon a spring for its operation. The assembled engineers inspected the mechanism carefully and told the inventor that unless a friction clutch were substituted for the spring the mechanism never would operate. Upon receipt of this advice the inventor spent two years on the development of a friction clutch and then returned to a spring. By a slight modification in the cross-section of the wire used in the spring, the mechanism was made operative. Two years had been wasted because of a lack of spring knowledge among engineers.

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SINCE that time much has been done towards the development of new facts pertaining to springs and in the dissemination among engineers of spring knowledge already in the possession of spring manufacturers. Spring manufacturers who have been in business from seventy-five to one hundred years have shared their knowledge with spring users and as a consequence the average engineer and machine designer are infinitely better equipped with spring knowledge today than was the case two decades ago. Should the problem which confounded engineers twenty years ago, arise today in almost any reputable manufacturing company, it is altogether likely that it could be solved by the average draftsman.

✦ ✦ ✦

FIFTEEN years ago the Special Research Committee on Mechanical Springs of the American Society of the Mechanical Engineers was formed. This committee looked over the general field of spring knowledge and decided that too little was known about springs by the average draftsman and designer. After arriving at this decision a Spring Bibliography was compiled and published which included most of the reliable spring literature compiled up to that time.

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THE publication of this bibliography resulted in a gratifying spread of spring knowledge. As a result of a questionnaire sent out to manufacturers, this committee then went to work to find out more about some of the problems for which the knowledge of art, at that time, offered no answer. Largely as a result of the activities of this committee more progress has been made in the study of springs during the past fifteen years than during the fifty years immediately preceding the organizing of the committee.

✦ ✦ ✦

SOME of the problems, the solution of which was undertaken by the committee or by individuals under the auspices of the committee were the evolution of new formulas for stress analysis. In 1912, **Röver** had advanced a theory on the distribution of stress in closely coiled helical springs. In 1929, **A. W. Wahl** presented a paper at a meeting of the Spring Research Committee in which Röver's theory was proven experimentally and the formulas for stress determination, simplified.

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AN extended programme of research into the effects of combined corrosion and fatigue on springs and spring materials was undertaken, under the sponsorship of the committee by **Dr. D. J. McAdam Jr.** As a result of this, and other investigations, spring manufacturers and spring users renewed their interest in non-ferrous spring materials and the matter of electro

deposited metal coatings for steel springs.

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THE investigation of stress strain relationship of spring materials carried on by the committee has resulted in an improved design for instrument springs, and has been largely responsible for the increased application of helical springs in this field.

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THE development of at least two new spring alloys, Beryllium Copper and Iso-elastic metal, are of very recent origin. The first is a non-ferrous alloy with comparatively high fatigue resisting properties, and the second, a ferrous alloy having a zero temperature modulus coefficient.

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THE developments outlined above, are simply a few highlights of recent progress in the field of spring design and manufacture. Perhaps the greatest accomplishment has been the putting into the hands of engineers, draftsmen, and machine designers, facts regarding springs, hitherto not generally known. Cooperating with the Engineering Societies and technical publications in this effort, spring manufacturers have been extremely active and the results are already manifest in better specifications covering the requirements of spring users.

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Spring Problems Yet to be Solved

IN spite of the work that has already been completed in the study of springs and spring materials there still remain a number of problems, the solution of which would be a decided aid to manufacturers of machinery in general and to spring users in particular. In recent years there has been a much wider application of springs in the field of measuring and testing instruments. Such springs must conform to exacting load-deflection specifications and in order that they meet with these tolerances it is necessary to be able to hold the coil diameter within very close limits. This problem is one, not only for the spring manufacturer, but also for the manufacturer of spring material. When wire is coiled into springs whether it be upon a arbor or a spring coiling machine, there is a tendency for the material to assume its original state, that is, to spring back from the arbor so that the diameter of the finished coil, when the wire is released, is somewhat larger than when it was wound tightly around the arbor. This occurs even in annealed wire. The amount that the wire will spring back depends upon the temper of the material itself. The accompanying chart (Fig. 1) shows how the hardness of the wire affected the outside diameter of springs all coiled on the same arbor. This chart was plotted upon results obtained with annealed high carbon steel. Fig. 2 shows the effect which this change in the outside diameter of the spring has upon the load deflection characteristic of the spring itself. It will be readily appreciated that any slight change in the hardness of the wire will cause an appreciable change in the load-deflection characteristic of the finished spring.

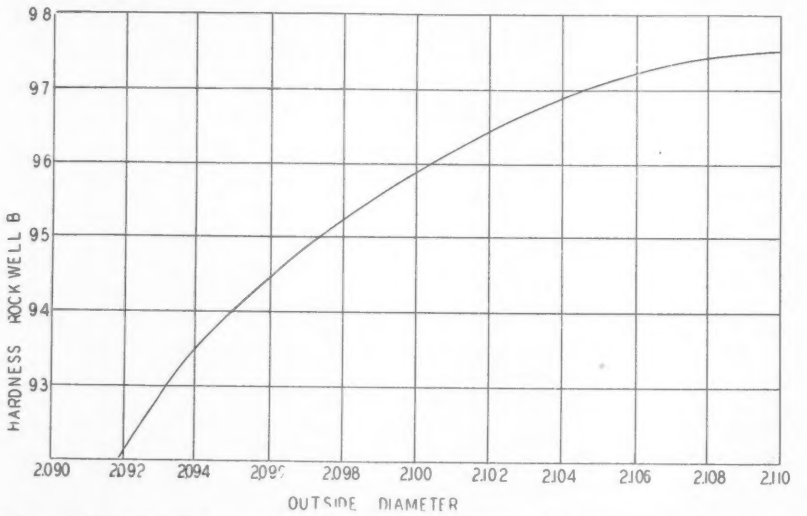

Fig. 1—Effect of wire hardness on the outside diameter of springs coiled on the same mandril. As the hardness of the wire increases even slightly, there is a noticeable increase of the outside diameter of the coiled spring due to the spring back from the mandril after the wire is cut. ✦ ✦ ✦

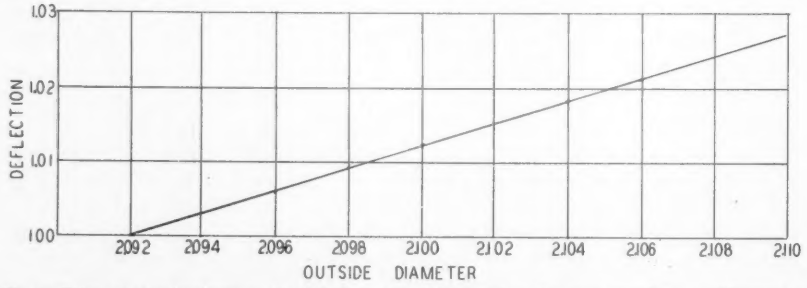

Fig. 2—Effect of wire hardness on the deflection of springs coiled on the same mandril. A difference in Rockwell B hardness of five points will cause a difference in the outside diameter spring which may result in a change in the deflection characteristic of as much as 3%. ✦ ✦ ✦

✦ ✦ ✦

IT is possible that none of the hardness tests at present available is the best indication of what may be expected in the dimensional change of the coil, after cut off. It is well known that generally the softer the condition of the wire, the less variation will be in the outside diameter of springs wound from different coils of wire from the same heat. This problem is one that can be solved only by the cooperative efforts of the spring maker, the wire manufacturer, and the maker of testing apparatus.

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THE development of uniform tolerance specifications for commercial springs, presents still another problem, the solution of which would eliminate much confusion and wasted effort among spring manufacturers. These tolerance specifications should include such items as tolerances on wire diameter, outside and inside diam-

eter of coil, free height, number of coils, squareness of ends (in the case of compression springs), etc.

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IT is a frequent occurrence for a spring manufacturer to receive outside diameter or free length specifications in which the fractional dimension has been reduced to decimals and the specification will read some figure such as "Outside diameter . . . 3.0625" exact." Such a specification is of course, impossible to meet, in commercial springs, and subsequent correspondence, with its consequent delay is necessary before final specifications are ultimately agreed upon.

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SEVERAL manufacturing concerns have drawn up commercial specifications for the use of their customers, which merit favorable comment. However, there exists among the trade generally a noticeable lack of uniformity in this direction, the correction of which would be of benefit to all.

✦ ✦ ✦

ANOTHER problem which cannot be considered completely solved is the protection of steel springs against the effect of combined corrosion and fatigue, while it is true that with the development of such alloys as Beryllium copper which it has been possible in some instances to substitute for steel, a non-ferrous material, has offered a partial solution to this problem. Up to this time however no non-ferrous material has been developed which shows as high an elastic limit as spring steel or which shows as good fatigue properties in dry air. Research work by Dr. D. J. McAdam Jr. showed that a chromium-vanadium steel specimen which had a fatigue limit in the air of seventy thousand pounds per square inch and a fatigue limit in fresh water of less than twenty thousand pounds per square inch could be considerably improved as far as corrosion and fatigue conditions were concerned by plating with a coating of cadmium. Such a coating .0002 inch thick brought the endurance limit in water up to thirty-five thousand pounds per square inch, whereas a coating .0004 inch thick brought the endurance limit up to about forty thousand pounds per square inch. This improvement is brought about by preventing contact between the water in which the specimen was tested and the steel itself. One interpretation of these results might indicate that the difference of the fatigue limit on the uncoated specimen in the air and the coated specimen in fresh water was due to the fact that incomplete protection was offered by the cadmium plating. It might be further assumed that if a plating could be developed which would offer complete protection of the steel itself, the fatigue limit of the coated specimen in water might be raised to that of the uncoated specimen in air. The improved performance in water of the specimen coated with .0004 inch cadmium plating over that of the specimen coated with a .0002 inch cadmium plate might be attributed to the fact that the heavier cadmium plate offered a more complete protection of the steel itself than the lighter coating. It would be interesting to investigate the effect of a still heavier coating as well as different methods of applying such a coating. A uniform method of applying an electro deposited coating steel which will preclude the possibility of hydrogen embrittlement would also be of considerable interest to spring users. Especially in the case of springs which are operating at a high frequency in varied atmospheric conditions such as airplane engine valve springs.

✦ ✦ ✦

Accurate Spring Manufacturing Co. Moves to Larger Quarters

ACCURATE Spring Manufacturing Company of Chicago, Illinois, manufacturers of springs, wire forms and metal stampings, will move to larger quarters this month in order to accommodate the increased volume of business which this company has undertaken this year.

✦ ✦ ✦

DURING the past two years, this Company has experienced a phenomenal growth. In 1935 it occupied 3,000 sq. ft. of floor space and employed not more than 25 men. At present the Company employs 125 men and occupies 30,000 sq. ft. of floor space.

(*Please turn to Page 265*)

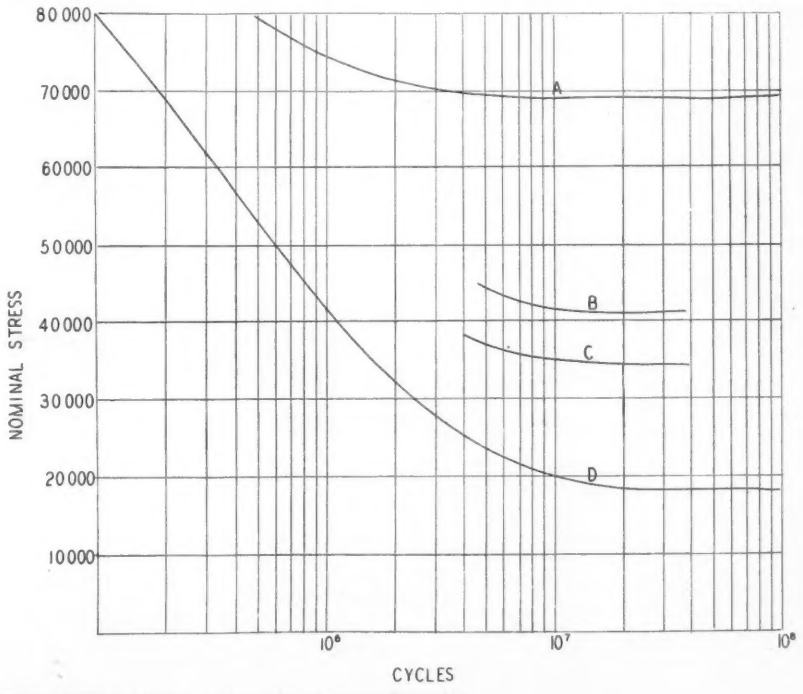

Fig. 3—Results of fatigue tests on chromium-vanadium wire.
a—uncoated wire tested in air.
b—wire with .0004 inch cadmium plating, corrosion fatigue tested in fresh water.
c—wire with .0002 inch cadmium plating, corrosion fatigue tested in fresh water.
d—uncoated chromium-vanadium specimen fatigue tested in fresh water. ✦ ✦ ✦

Things Worth Knowing About Nails

THE following extract from the March, 1937 bulletin of the Atlantic Steel Company, Atlanta, Ga., will undoubtedly be of interest:

THE universal use of nails has given rise to the expression, "Hitting the Nail on the Head," which is used almost as frequently as the mechanical operation, to which it alludes, takes place. Finished steel finds its widest distribution in the form of nails. It is safe to estimate the annual consumption of nails in the United States at not less than 250 for every man, woman and child in the country.

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AN article of such wide consumption merits at least a brief study of its origin and development. Up to the end of the Colonial period, all nails used in the United States were hand-made. They were forged on an anvil from nail rods which were sold in bundles. In the quarter of a century immediately preceding the War of Independence, the making of nails from these rods was a household industry among the New England farmers.

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THE struggle of the Colonies for independence intensified search for short cuts to mass production of material entering directly or indirectly into the prosecution of the war. Thus came about the innovation of cut-nails made by machinery, as a result of which the household industry of nail-making declined rapidly.

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WIRE nails were first made in this country as early as 1851, but it was not until 1875 that serious endeavors were made to manufacture wire nails at one operation. Slowly, but steadily, the wire and nail industry in the United States grew. By 1885 there were 26 wire nail manufacturers in the country and the number has since more than doubled.

"D" Stands for "Penny," Not "Darn"

THE "penny" system of designating sizes of nails originated in England. Two explanations are offered as to how this curious designation came to be adopted. One is that the six penny, four penny, ten penny, etc., nails derived their names from the fact that one hundred cost six pence, four pence, etc. The other explanation, which is more probable, is that one thousand ten penny nails, for instance, weighed ten pounds. The ancient as well as modern abbreviation for penny is "D" the first letter of the Roman coin denarius; the same abbreviation was once used for the English pound in weight. At any rate, the letter "D," pronounced "Penny," is still used in designating the size of wire nails. This will be news to the lady who, reading from a list of hardware items, called for five pounds of "8D" nails and said she didn't know what the "D" stood for unless it might be "darn."

Method Developed For "Flash" Drying Metal Under Vacuum

A METHOD of thoroughly drying metal wire and other metal articles without danger of oxidation has been developed by the **E. J. Stokes Machine Co.** of Philadelphia. Their method is as follows: The material to be dried is placed in a special Vacuum Chamber from which oxygen, together with the inert constituents of the air, is removed. The materials are then heated and this heat stored in the metal is utilized rapidly to remove the residual moisture from all surfaces and all interstices of the articles treated.

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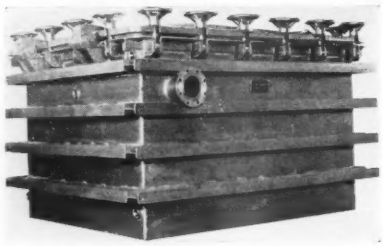
THIS method has been used successfully to dry copper wire which has been "bright annealed" and then pickled and washed. The wire can be dried thoroughly without oxidation before going to the enameling machine where even a very thin oxide scale would prevent proper adherence to the enamel.



Vacuum Drying Chamber.

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ANOTHER example of this method is its application in the thorough drying of all portions of electrical circuit breakers including places inaccessible to mechanical removal of moisture. This thorough drying prevents the staining or corrosion of the metal caused by plating chemicals oozing out while the breaker is in use or in the stock room. Such staining or corrosion frequently necessitated replating and reassembly of the parts before the breakers could be shipped. The same apparatus can be used for vacuum rinsing of the breakers insuring more complete removal of the plating chemicals before drying takes place.

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MANUFACTURERS whose operations involve the drying of metal wire or metal parts may wish to investigate "flash" drying under vacuum as a possible solution to their problems. The illustration shows the type of equipment developed by the manufacturer and used in the cases mentioned above.

Rubber Coating Wire Products

AN anodic dipping process to coat metal articles with rubber has recently been developed by the Belke Manufacturing Company, Chicago, Illinois, who at the present time are doing this work on a contract basis in the following manner:

First the product is thoroughly cleaned in a boiler cleaner, then is dipped in a bath of cement and allowed to dry. After this it is submerged in a coagulant bath and is again allowed to dry a short time. Then it is dipped into a liquid latex tank which is chemically charged. The amount of rubber applied is governed by the length of time it is allowed to remain in the latex tank. After this process the product is hung up to dry in a hot room at about a 150° temperature. It remains here for three days and is then lacquered and ready for shipment.

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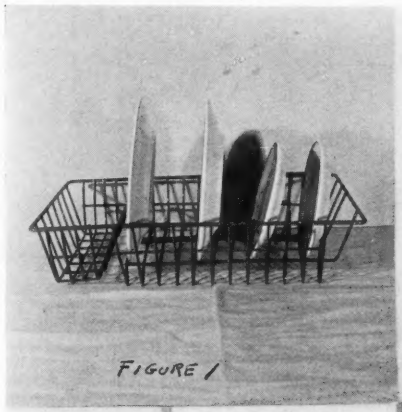
THE illustrations shown are of wire products to which this rubber covering has been successfully applied.

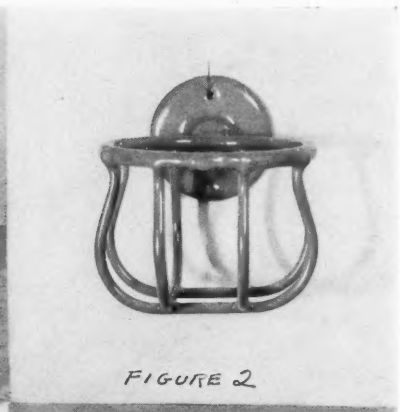
Figure 1 is a dish drainer which was rubber covered in a lustrous green and a bright red. About 2500 of these were produced for the Washburn Company.

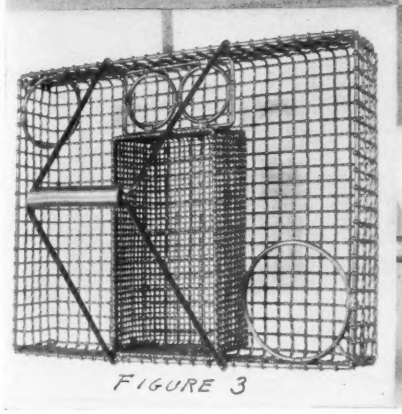
Figure 2 shows a bathroom cup holder rubber covered.

Figure 3 is a hospital tray rubber covered for sound-deadening purposes.

Figure 4 is the frame for an automobile wind shield fan.







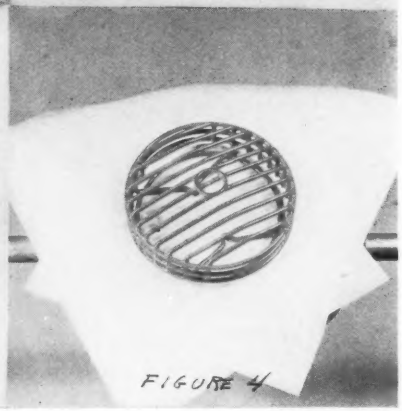


Fig. 1. Rubber Covered Dish Drainer.
Fig. 2. Rubber Covered Bathroom Cup Holder.
Fig. 3. Rubber Covered Hospital Tray.
Fig. 4. Rubber Covered Automobile Windshield Fan.

MANY other applications of this rubber coating process to wire and wire products have been found, among them being the covering of automobile aerials as a protection against the elements. It has also been found that this covering acts as a sound deadening protector, eliminates vibration, resists abrasion, protects against corrosive and errosive acid conditions and that many novel effects in finished products can be secured through its use.

Stainless Steel Wire in Automobile Wheels

A SUBSTANTIAL increase in the production of stainless steel wire by the wire division of Firth-Sterling Steel Co., McKeesport, Pa., has resulted from the adoption of steering wheels with wire spokes by a large number of automobile manufacturers, L. Gerald Firth, president, has announced. Since each steering wheel of the most generally used design requires 15 spokes made of a specially treated stainless steel, this division of the company is working full time.

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THE new wire spoke steering wheels have become standard equipment on many 1937 models and optional equipment on the major number of cars. They are designed to reduce road vibration and to add to appearance, and since they are unlikely to break in an accident, they provide an added safety feature.

All wire production men are cordially invited to attend the Pittsburgh Regional Meeting of the Wire Association at the William Penn Hotel on Friday, May 21, 1937, at 7:00 P. M.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in Feb. 1937 and Feb. 1936
(In Gross Tons)

	FEB. 1937	JAN. 1937	FEB. 1936
Wire rods	1,680	3,279	1,786
Hoops, band and strip steel	6,838	8,400	4,367
Plain, black or galvanized iron or steel wire	3,754	4,200	1,922
Barbed wire and woven wire fencing	2,956	3,523	2,554
Woven wire screen cloth	152	126	74
Wire rope	477	215	183
Insulated iron or steel wire and cables—see analysis below			
Other wire and manufactures	524	539	488
Wire nails	1,432	1,087	674
Tacks	33	23	15
Other nails, including staples	293	203	167
Bolts, machine screws, nuts, rivets and washers	895	698	448
Total, these 11 classifications	19,034	22,293	12,678

Imports of Iron and Steel Wire Into the United States
(In Gross Tons)

Concrete reinforcement bars	98	772	107
Hollow bars and drill steel	199	164	130
Wire rods	974	1,626	2,192
Barbed wire	290	1,585	1,885
Round iron and steel wire	453	325	425
Telephone and telegraph wire		6	1
Flat wire and strip steel	225	282	234
Wire rope and strand	197	227	173
Other wire	279	278	164
Hoops and bands	2,407	2,141	1,278
Nails, tacks, and staples	1,704	1,171	2,611
Bolts, nuts and rivets	91	24	70
Total, these 12 classifications	6,917	8,601	9,270

Exports of Insulated Wire and Cable, February 1937

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Insulated iron or steel wire and cable	206,088	$ 38,756	976	$ 285
Rubber-covered wire	564,273	136,148	174,638	36,987
Copper weatherproof wire	176,380	27,342	68,717	12,901
Copper telephone cable	17,063	3,693	106,272	14,091
Other insulated copper wire	434,577	93,165	283,224	45,304
Nickel-chrome electric resistance wire	57,540	54,833	231	323
Total, these 6 classifications	1,455,921	$353,937	634,058	$109,891

Pig Iron Exports Feature of Export Trade

PIG iron exports were the highlight of the export trade during the first two months of 1937. In January, shipments aggregated 13,329 tons and climbed to 17,118 tons in February. The combined total—30,447 tons—compared with only 237 tons destined to foreign outlets in corresponding period of 1936. The extremely high rate of demand—and shortage of supplies—in the foreign producing areas is clearly indicated when it is noted that pig iron shipments from the United States in only the first two months have exceeded the aggregate shipments (25,312 tons) for the six-year period 1931-1936. Again, should the present average of export continue, the estimated 180,000 tons for 1937 would compare favorably with the total of 195,702 tons shipped during the four-year period 1927-1930.

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Ingot Shipments Climb—Tin Plate Exports Dip

AN increased trade was registered in 42 iron and steel classifications, comparing February totals with those for January, while in 23 lower tonnages went forward. The chief gain (7,037 tons) was that in ingot shipments, others of moment occurring in 'other' plate (4,327 tons), pig iron (3,798 tons), seamless casing and oil-line pipe (3,435 tons), fabricated plates (3,238 tons), and fabricated shapes (1,714 tons). Tin plate exports recorded the most pronounced decline (6,200 tons), followed by those in hot-rolled strip steel (1,963 tons), galvanized steel sheets (1,762 tons), wire rods (1,599 tons), and barbed wire (774 tons).

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Tin Plate Still Leads Export Group

NOTWITHSTANDING the dip in tin plate shipments during February, that product remained the leading one shipped during the month, its aggregate of 19,032 tons going principally to Japan (3,867), Brazil (2,236), China (1,517), Canada (1,246), the Union of South Africa (1,179), Mexico (1,170), and Argentina (1,138) in a scattered trade. Next came pig iron's surprising total of 17,118 tons which, for the most part, went to Japan (14,764), and Sweden (1,500). Then followed the wide-spread trade (13,218 tons) in black steel sheets, the leading purchasers being Canada (6,013), Soviet Russia (2,742), and Mexico (1,150). 'Other' plate ranked next and its total of 11,416 tons found a wide range of markets in which the most prominent were Sweden (2,824), Canada (1,592), Finland (1,584), and Mozambique (1,058). Ingots (6,871 tons) followed and were taken mostly by Japan (3,976), Mexico (2,240), and Greece (508). Shipments of seamless casing and oil-line pipe jumped to 6,586 and went chiefly to Mexico (4,658), and Venezuela (1,136).

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North and Central America and the West Indies Retain Leading Position

WITH purchases aggregating 49,092 tons, the above-named area accounted for 35.0 percent of all shipments made in February (39.0 percent in January), and continued as the leading outlet area for iron and steel products (excluding scrap) shipped from the United States. Far Eastern purchases were high—36,306 tons—in accounting for 33.0 percent (33.0 percent), while the next area of importance — South America — took 22,860 tons, or 16.4 percent (14.1 percent). Next were European purchases — 16,670 tons — which made up 12.1 percent of the aggregate (9.8 percent), with Africa's trade of 4,788 tons next in importance and representing 3.5 percent (4.1 percent).

Shipments to Canada Highest

EXPORTS to Canada reached 25,580 tons, that market retaining its leading position in this trade, and were chiefly of black steel sheets (6,013), hot-rolled strip steel (3,575), skelp (2,624), steel bars (2,432), plain shapes (2,064), and 'other' plate (1,685). Next came Japan's total of 26,814 tons made up mostly of pig iron (14,764), tin plate (3,867), and wire rods (1,255). Following was Mexico whose trade of 14,115 tons was primarily of seamless casing and oil-line pipe (4,658), ingots (2,240), tin plate (1,170), black steel sheets (1,151), and seamless black pipe (943). In a trade aggregating 7,064 tons, the Philippine Islands took chiefly galvanized steel sheets (1,163), cast-iron pressure pipe (1,011), plain shapes (921), and black steel sheets (511). Brazil's purchases of 6,446 tons ranked next and were mostly tin plate (2,236), light rails (970), plain wire (609), black steel sheets (563), and heavy rails (501). China was the sixth market and accounted for 5,836 tons made up chiefly of fabricated plates (1,525), 'Other' steel bars (727), black steel sheets (634), and 'other' plate (543).

✦ ✦ ✦

Slight Lag in February Imports

FEBRUARY imports of iron and steel products (excluding scrap) into the United States aggregated 39,157 gross tons valued at $1,671,272 against 40,642 tons valued at $1,716,324 in January, and 35,796 tons valued at $1,447,897 in February 1936. In comparison with the January totals, the trade in February recorded losses in 18 classifications with offset gains in 19, and in 2 items (iron slabs and sashes and frames) no trade resulted in either month. The outstanding decline (1,624 tons) was that in solid and hollow bar receipts, followed by those in shapes (1,157 tons), pig iron (1,094 tons), ferromanganese (820 tons), barbed wire (665 tons), and wire rods (652 tons). The outstanding gain registered (1,297 tons) was that in rails and track material, others of moment occurring in receipts of 'other' pipe (1,093 tons), sponge iron (838 tons), spiegeleisen (570 tons), and nails, tacks, and staples (536 tons).

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Pig Iron Remains Chief Item of Import

FROM the standpoint of tonnage, pig iron continued in February to be the outstanding product imported, its total of 11,340 tons coming mostly from British India (5,863), Soviet Russia (2,967), the Netherlands (1,332), and Canada (653). Next were shapes (6,762 tons) supplied chiefly by Belgium (5,669), and France (990). Then followed solid and hollow bars (3,480 tons), taken principally from Belgium (2,180), France (695), Sweden (465). Fourth were 'other' hoops and bands in a total trade of 2,407 tons, of which the bulk came from Belgium (1,793), France (333), and Germany (176). Ranking next were nails, tacks, and staples whose total of 1,707 tons was purchased chiefly from Bel-

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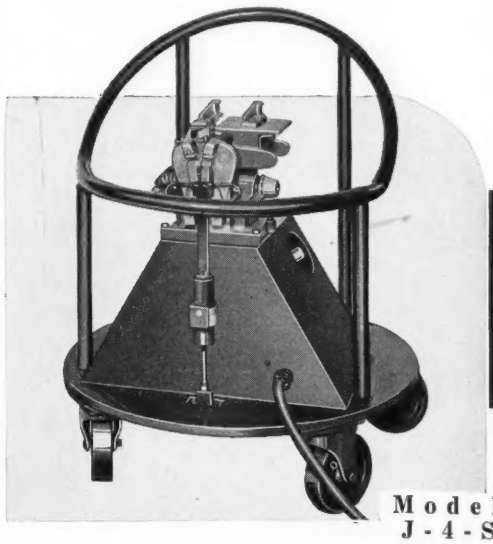

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Model J-4-S

The wide-spread demand for a portable, low-type welder is successfully met by this new MICRO Model J-4-S.

Height to welding dies—23".

Round steel base—no corners or edges to catch wires.

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Welding headpieces—hard bronze.

Full swivel casters—easy to move in any direction.

Guard rail—protects working parts.

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Outstanding Personalities of the Wire Industry

R. J. Wysor, President, Republic Steel Corporation

T. M. Girdler, who was re-elected Chairman of the Board of Directors of Republic Steel Corp., announced the election of R. J. Wysor as President of the Corporation following a meeting of the board.

✦ ✦ ✦

COMMENTING on Mr. Wysor's election, Mr. Girdler said that "The elevation of Mr. Wysor to the Presidency of Republic is a well deserved recognition of the efficient and loyal service rendered to the Corporation by him since its formation in 1930."

✦ ✦ ✦

MR. Wysor is fifty-one years of age. He has been associated with Republic since its formation in 1930, having been Vice President in charge of Operations from 1930 to September 1935, and Executive Vice President and General Manager since that date.

✦ ✦ ✦

MR. Wysor has been active in the steel business for the past thirty-one years. Immediately prior to his connection with Republic, he was General Manager of Jones & Laughlin Steel Corp., of which corporation Mr. Girdler was then President. When Mr. Girdler resigned to accept the position of Chairman of the Board of Republic, Mr. Wysor went with him to Republic as Vice President in Charge of Operations.

✦ ✦ ✦

IN the 29 years since Mr. Wysor was graduated from the Virginia Polytechnic Institute, he has been almost continuously in the steel business and has worked for four of the five largest steel companies in the country. For about a year and a half, in the period 1910 to '11, he was a partner in a New York consulting laboratory and a metallurgist for the Panama Canal Commission.

✦ ✦ ✦

WYSOR started his business career as a chemist for the Carnegie Steel Corp. It was soon after he was made assistant chief

R. J. WYSOR
President, Republic Steel Corp.

chemist that he embarked on his own business venture. In 1912 he became chief chemist for Bethlehem Steel Co.'s home plant at Bethlehem where he was responsible for the quality of all the materials that entered the plant. His next promotion was to the superintendency of the Bethlehem blast furnaces and from there to the position of superintendent in charge of the Service Division. In 1919 he was made assistant general manager of the Maryland plant at Sparrows Point. In 1923 when Bethlehem acquired the Cambria Steel Co., Johnstown, Pa., Wysor was made its assistant general manager which position he occupied for about two and a half years.

✦ ✦ ✦

HE then went with Jones and Laughlin as assistant general manager working with T. M. Girdler, chairman of the Republic Steel Corp., who was then general manager. Two years later when Girdler was elected president, Wysor succeeded him as general manager.

✦ ✦ ✦

Wheeling Corrugating Co. Appoints L. A. VerBryck Manager of Division

L. A. VerBRYCK has been made manager of the welded wire products division of the Wheeling Corrugating Company and will have his headquarters at Wheeling, W. Va., where the general offices and factories are located. The welded wire products division is responsible for sales of building fabric, pipe fabric and also paving fabric and accessories.

✦ ✦ ✦

MR. VerBryck was for a number of years associated with the Pittsburgh Steel Company.

✦ ✦ ✦

Westinghouse Promotes Lund

AT a meeting of the Board of Directors held at New York recently, **Lawrence H. Lund** was elected assistant treasurer of the Westinghouse Electric & Manufacturing Company. Mr. Lund joined the Westinghouse Electric International Company January 7, 1931 as auditor and has remained with that organization until his election to office in the parent company. He will make his headquarters in Pittsburgh.

✦ ✦ ✦

Holton Joins Carboloy

CARBOLOY Company, Inc., Detroit, Michigan, manufacturers of cemented carbide tools, dies, and wheel dressers, announces that **Mr. P. H. Holton** has been added to the sales engineering personnel of the Philadelphia territory. Mr. Holton has an exceptionally broad background of experience in the metal working field, having served for over twenty years in sales and production capacities.

✦ ✦ ✦

John May, General Sales Manager, American Steel & Wire Co.

JOHN MAY, assistant general manager of sales for electrical wires and wire rope, American Steel & Wire Co., Worcester, Mass., has been transferred to Cleveland as general manager of sales, effective March 1. He succeeds D. A. Merriman who as vice president will remain active in the company until he reaches the retirement pension age in September.

A Review of Recent Wire Patents

No. 2,070,714, INSULATED MATERIAL AND METHOD OF MAKING THE SAME, Patented February 16, 1937 by Camille Dreyfus, New York, N. Y.

A wire conductor is provided having a covering of an insulator which comprises an impervious outer layer, consisting entirely of an organic derivative of cellulose composition, enclosing separate windings consisting solely of strips of foil of the same composition. The inventor suggests cellulose acetate as the organic derivative.

✦ ✦ ✦

No. 2,070,851, WOOD SCREW, Patented February 16, 1937 by Gordon T. K. Woodley, Waterford, Ontario, Canada.

Retrograde rotation of the screw is prevented by the provision of lugs extending outwardly from the threadless portion of the screw shank. It is claimed that the provision of these lugs will not hamper the use of the screw.

✦ ✦ ✦

No. 2,071,137, UNIVERSAL COILING MACHINE, Patented February 16, 1937 by Herman N. Neidt, Torrington, Conn., assignor to The Torrington Manufacturing Company, Torrington, Conn., a corporation of Conn.

The construction includes an upper roll, a pair of rolls positioned below and one on either side of the upper roll arranged to impart a downward and then an upward curvature to a strip of metal fed between the upper and lower rolls, means for driving the upper roll in one direction and the lower rolls in the opposite direction, and means connected with and operated by the drive for gradually moving the rear lower roll away from the upper roll throughout the coiling operation to progressively increase the diameter of the coil and coil the convolutions in spaced relation.

✦ ✦ ✦

No. 2,071,210, MANUFACTURE OF WIRE NETTING, Patented February 16, 1937 by Wilhelm Kramer, Emmerich, Germany.

More specifically, the machine is provided for the manufacture of wire netting with longitudinal and transverse wires electrically welded at their crossings.

✦ ✦ ✦

No. 2,071,685, FASTENING, Patented Febuary 23, 1937 by Frank H. Ellsworth and George A. Gleason, Worcester, Mass., assignors to The American Steel and Wire Company of New Jersey, a corporation of N. J.

A metal fastening is provided, which may be of wire, constructed for frictional insertion in wood and characterized by having a coating consisting of any of the resins of glycerolphthalic acid. It is stated that this coating adheres firmly and has a high coefficient of friction with wood.

✦ ✦ ✦

No. 2,071,709, WIRE STRAND, Patented February 23, 1937 by Harvey W. Riddle, Worcester, Mass., assignor to The American Steel and Wire Company of New Jersey, a corporation of N. J.

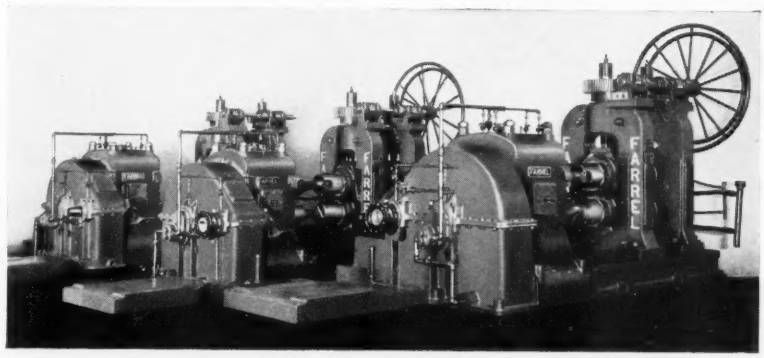
Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

The method includes intertwisting circular wires into a strand and removing sufficient metal from at least some of the outer ones to make them non-circular, these outer ones being of greater diameter than the diameter of the next adjacent strands.

No. 2,071,715, ROD AND WIRE HANDLING MECHANISM, Patented February 23, 1937 by Frederick A. Westphal, Kansas City, Mo., assignor to Sheffield Steel Corporation, Kansas City, Mo., a corporation of Delaware.

The mechanism includes means for suspending a coiled bundle of rods or wire, and primary and secondary clicker members carried by the suspending and cooperating with the suspending

(Please turn to page 260)



" . . . . . the sweetest running mills in the plant"

Thus commented an operating executive of the plant where these three mills were installed.

That's the way Farrel Rolling Mills are designed and built to run . . . they have all the modern features of design which permit high speed operation, increase output, improve quality and reduce production costs.

These mills are two-high mills with 14″ x 18″ rolls. Two of them are operated in tandem for rolling brass strip at a delivery speed of 750 feet per minute. The third mill rolls copper strip at 1,000 feet per minute.

The roll journals operate in precision type flood lubricated sleeve bearings, and are connected to the pinion stand by universal spindles. The reduction gear drive and pinion stand are combined in an integral unit, with Sykes continuous tooth herringbone gears and pinions, antifriction roller bearings and built-in oil pump providing spray lubrication of the gear teeth and flood lubrication of the bearings. The top roll is provided with double handwheel adjustment and a dial on the adjusting screws is graduated in thousandths to facilitate close setting of the rolls. The stock is wound on a constant tension blocker with jaw type wrapper and air-operated stripper.

Our engineers will be glad to explain in detail the various features available on Farrel Rolling Mills and their applicability and advantages for specific conditions. A request for a conference involves no obligation.

FARREL-BIRMINGHAM
Company, Inc.
38 Main St., Ansonia, Conn.

A Review of Recent Wire Patents

(*Continued from Page 259*)

means to regulate successive withdrawal of convolutions from the bundle from off the suspending means, one of the clicker members having a double contact with the suspending means to permit alternate engagement thereof with the convolutions during withdrawal of the convolutions from the bundle.

✦ ✦ ✦

No. 2,070,260, WIRE COATING PROCESS AND APPARATUS, Patented February 23, 1937 by Randall W. Schultz, Williamsport, Pa., assignor to Metalloys Company, Williamsport, Pa., a corporation of Pennsylvania.

The process relates to the coating of the metallic wire with a second metal and comprises moving the wire to be coated through a casting die, drawing molten coating metal through the die around the wire and simultaneously removing the air from around the die to prevent oxidation by means of a partial vacuum beneath the die.

✦ ✦ ✦

No. 2,072,069, COMPOSITION OF MATTER FOR COATING INDUSTRY, Patented February 28, 1937 by Carlton Ellis, Montclair, N. J., assignor to Ellis-Foster Company, a corporation of New Jersey.

In order to increase the adhesion and flexibility of chlorinated rubber when employed as a coating, the inventor mixes therewith xylenol-aldehyde resin and tung oil.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

✦ ✦ ✦

No. 2,072,230, METHOD AND APPARATUS FOR MAKING WIRE FRAMES FOR CANDLE HOLDERS, Patented March 2, 1937 by Leo Weiss, Brooklyn, N. Y., assignor of one-twentieth to N. D. Q. Specialty Corporation, Brooklyn, N. Y., a corporation of New York.

The candle holders are of the type comprising a helical socket portion and a shank, both of wire, to be inserted into cakes and the like.

✦ ✦ ✦

No. 2,072,241, MEANS FOR CARRYING COILS OF WIRE OR TAPE-SHAPED BODIES, Patented March 2, 1937 by Semi Begun, Berlin, Germany, assignor to C. Lorenza Aktiengesellschaft, Berlin-Tempelhof, Germany, a company.

More specifically, the invention resides in the provision of means to prevent uncoiling of the wire, when coiled.

✦ ✦ ✦

No. 2,072,284, MACHINE FOR MAKING SPIRAL WINDINGS, Patented March 2, 1937 by Harris Watson Voorhees, Morrisville, Pa., assignor to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey.

This machine is adapted for coiling wire into flexible casings for Bowden wire devices, the casings being of closely arranged spirals of relatively flat wire.

✦ ✦ ✦

No. 2,072,557, FLAME RESISTING CONDUCTOR, Patented March 2, 1937 by Anthony P. Hinsky, Brooklyn, N. Y., assignor to Pyro Products Corporation, Brooklyn, N. Y., a corporation of New York.

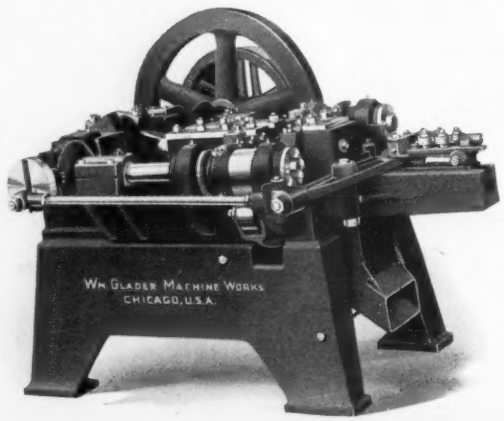
The wire conductor is provided with a fibrous jacket which is treated with a flame-resistant saturant, with a coating of blown asphalt applied over the saturant-treated jacket.

✦ ✦ ✦

No. 2,072,712, COMMUNICATION CABLE, Patented March 2, 1937 by Ernst Fischer, Berlin-Lichterfelde, Germany, assignor to Siemens & Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany, a corporation of Germany.

A long distance cable is provided for the transmission of low and high frequency currents in four-wire circuit connections, the wires being arranged in bundles, the arrangements being such that a high frequency conductor in a sub-bundle making up the bundles, has

HIGH SPEED WIRE NAIL MACHINE



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Glader Machines are fast, easy to operate, and are highly efficient.

If you are planning on nail plant expansion or replacements let us figure with you.

Glader Machines have been adopted as standard equipment in all recent major nail mill installations.

There must be a reason.

For further information, prices, etc. write to us.

A Review of Recent Wire Patents

only low frequency conductors located adjacent to it.

✦ ✦ ✦

No. 2,072,890, SPRING CUSHION, Patented March 9, 1937 by Edward A. Krims, Chelsea, Mass., assignor to Kay Manufacturing Corporation, Brooklyn, N. Y., a corporation of New York.

The end coils of the spiral spring are provided with vertically arranged depressed portions, about which the helical springs are threaded to hold the adjacent spirals against relative movement, so as to prevent noises.

✦ ✦ ✦

No. 2,073,283, METHOD FOR CONTINUOUS WIRE DRAWING AND ANNEALING, Patented March 9, 1937 by John R. McKean, Rumford, and Herbert S. Busey, Providence, R. I., assignors to Kennecott Wire and Cable Company, a corporation of Rhode Island.

The method includes the steps of passing the wire through an annealing flame, then enveloping the annealed wire, as it emerges from the flame, in an atmosphere containing combustible gases and water vapor and from which the atmospheric air is excluded, and finally cooling the annealed wire while it is in the enveloping atmosphere.

✦ ✦ ✦

No. 2,073,343, WIREWORKING MACHINE, Patented March 9, 1937 by Bernard Heilman, Detroit, Mich., assignor to L. A. Young Spring & Wire Corporation, Detroit, Michigan.

More specifically, a coil-forming machine is provided and is adjustable for forming coils in which certain of the individual convolutions differ widely in shape and diameter from other convolutions of the coil.

✦ ✦ ✦

No. 2,073,928, REEL FOR COILING WIRE, Patented March 16, 1937 by Josef Gassen, Dusseldorf-Oberkassel, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany, a corporation of Germany.

This reel is particularly adapted for taking up wire which is discharged by the last stand of a rolling mill and this particular reel may be employed, selectively, on the Garrett or the Edenborn mill.

✦ ✦ ✦

No. 2,073,942, METHOD OF MAKING MULTIPLEX FASTENERS OR NAILS, Patented March 16, 1937 by Joseph H. McFaul, Chicago, Ill., assignor to The Gerrard Company, Inc., a corporation of Delaware.

This is apparatus adapted for making nail strips from flat material, the strips having a wavy cross section.

✦ ✦ ✦

No. 2,073,943, METHOD OF MAKING MULTIPLEX FASTENERS OR NAILS, Patented March 16, 1937 by Joseph H. McFaul, Chicago, Ill., assignor to The Gerrard Company, Inc., a corporation of Delaware.

The method is provided for manufacturing the nails referred to in patent 2,073,942 and comprises simultaneously slotting and perforating a flat strip of material along parallel lines, intermittently advancing the strip to a given point corrugating the strip transversely, severing the strip into a plurality of parallel duplex strips, and dividing the duplex strips into individual nail strips.

✦ ✦ ✦

No. 2,074,224, DRAWING WIRE, Patented March 16, 1937 by Carl Johnson, Maplewood, N. J., assignor to Oakite Products, Inc., a corporation of New York.

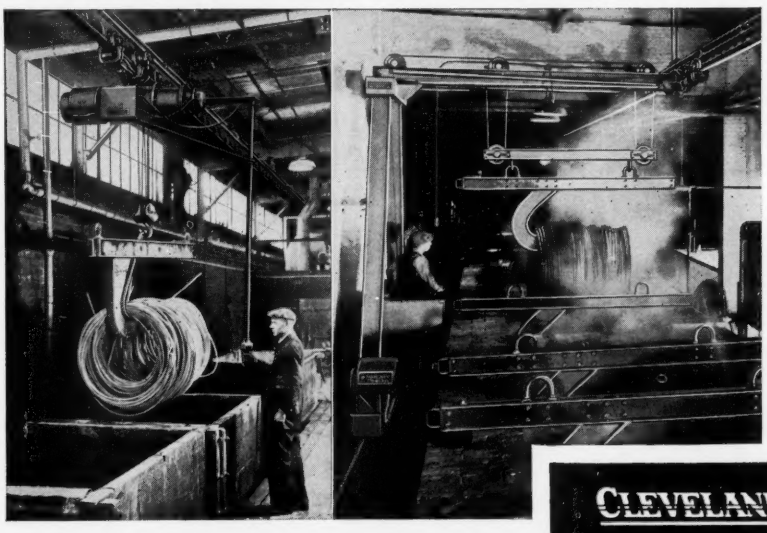
A composition is provided for coating metal rods to be drawn into wire, without the use of lime, this composition comprising about 30 parts bentonite, 7 parts soap, 40 parts talc and 63 parts sodium carbonate.

✦ ✦ ✦

No. 2,074,470, SCREW CUTTING MACHINE, Patented March 23, 1937 by Richard Herrmann, Stuttgart, Germany.

This screw cutting machine includes a feed-spindle which is of several parts, but does not employ a friction clutch coupling. It is claimed that, with this construction, the feed gear is less liable to damage.

OVERHEAD MATERIALS HANDLING EQUIPMENT



● By adopting the straight line layout your circular type cleaning house can be profitably rebuilt. A Cleveland Tramrail straight line layout eliminates congestion because loading and unloading are at opposite end of the tank line.

Consult your phone directory under Cleveland Tramrail.

● Required floor space can be reduced up to 50% — lends itself to expansion more readily than any other type, plus having many additional advantages —Ask us.

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DIVISION OF
THE CLEVELAND CRANE & ENGINEERING CO
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'Round the World With the Wire Industry

German Notes

THE demand for wire rods continues to be very heavy and prices are up. To the Far East £(paper) 12.5 is now quoted at cif basis. This is the highest post war price except during the Ruhr occupation in 1923. The German domestic wire rod price is now cheaper than the export price. Never before in this century has this been the case. The wire export market demand continues very heavy. The German wire industry is sold out for the period of approximately 4½ months; the wire netting industry for 5½ months. Most of the orders are being turned down. Japanese wire competition is unusually small and Japanese prices are very high. Only in wire mesh is Japan still a competitor. The present wire netting export price is about 30% more than a year ago. Prices for wire products were again advanced in March up to 15 shillings per ton. It is difficult to give quotations because prices are widely fluctuating up to £2 according to the various markets. German domestic prices stand unaltered and therefore in this field are now lower than export prices for some items which has never before been the case. Therefore the AVI export returns have been entirely abandoned for wire rods as the domestic makers are not hampered by cheaper wire rod export prices to foreign manufacturers. The keen demand on the wire market has extended to mesh and wire ropes. It is of interest to note that the demand for a superior quality is greater than for ordinary goods. For this quality high prices are paid and the average price for wire ropes rose from £38 per ton in 1933 to £52 last year and £60 this year.

WIRE ASSOCIATION

Welcome To

THE

AMBASSADOR

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When you come to Atlantic City, make your headquarters at the largest hotel nearest the auditorium . . . The Ambassador. You'll be adding hours of pleasure and enjoyment to your stay by being so close to everything that's going on. And The Ambassador is Atlantic City's finest hotel, located directly on the boardwalk with most guest rooms facing the Atlantic. You'll find everything you want at The Ambassador . . . comfortable rooms at moderate rates . . . fine restaurants . . . indoor swimming pool and other recreational facilities . . . spacious sun decks and public rooms. May we make a reservation for you now?

THE AMBASSADOR, ATLANTIC CITY

WILLIAM HAMILTON
Managing Director

HAROLD E. BAGGS
Convention Manager

✦ ✦ ✦

The Leipzig Fair

AT this year's Leipzig spring fair not less than 200 wire machines were seen in operation among which were a number of new types of wire nail presses and fine wire drawing machines of different types. The wire machinery industry reports that orders are in hand to keep the works busy for twelve to eighteen months; in some cases two years. Many orders had to be turned down, although prices for export are rising. American wire makers were among the visitors to the Leipzig Fair. Fourteen Americans connected with the wire trade bought Fair tickets.

✦ ✦ ✦

German Exports

THE demand for wire products from the United States has been very large and German and

'Round the World With the Wire Industry

Belgian makers had to reject business as all of the orders could not be accepted. Among the rush orders were a few for the flood devastated areas, mainly for wire netting.

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JAPAN, which as reported is an unimportant competitor now in wires and nails, is on the other hand a keen competitor in mesh. Japanese exports have nearly quadrupled since 1933, whereas wire nail exports were halved since 1934. Japan is selling chiefly the soft mosquito mesh of 2 x 50′ in 12-18 mesh (per inch), but the quality of the Japanese products is remarkably satisfactory. Japan is now gaining the Latin-American market with this product.

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Upward Tendency in French Activity

ACTIVITY in the French Iron and steel industry continues to increase. Important government contracts are still to be placed. The imposition of a new tax on production (amounting to 6%) by the Government will affect the prices of all metallurgical products sold for consumption. According to the present understanding of the law, it will not be applicable to products sold for further manufacture.

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Rolling Mill Established at Delft, Netherlands

ANNOUNCEMENT has been made by N. V. **Nederlandsche** Kabelfabriek of Delft, (Province of South Holland) that their plant will be extended with a Siemens-Martin smelting plant (with annexed rolling mill) which will enable the company to produce the iron wire and hoop iron required in the manufacture of its products —electric underground cables.

Republic Stockholders Approve New Pension Plan for Approximately 75 Officers and Key Employees

UNDER the Pension plan of the Republic Steel Corp. officers and employees will be entitled to receive pensions upon retirement, standard retirement age being fixed at 65 years. The sum for the payment of the pensions is to be provided for the most part by the purchase of annuity or insurance contracts from insurance companies, the annual premiums of which will be paid by joint contributions of beneficiaries and the corporation in the ratio of 60 per cent by the corporation and 40 per cent by employees.

✦ ✦ ✦

Cuban Iron and Steel Imports Up

IMPORTS of iron and steel products into **Cuba** through ths port of Habana (which accounts

(*Please turn to Page 264*)

Can you answer these questions?

1. **How can all the dirt, smoke, noise and fumes be eliminated from annealing and cleaning operations?**
2. **How can electricity be used more economically than gas or oil for annealing bolts, rivets, springs, rods and wire?**
3. **How can annealing cycles be cut down from hours to minutes?**
4. **Can annealing be accomplished with absolute uniformity and complete freedom from any surface change?**
5. **Are not other considerations trifling by comparison?**

The answers are in our new Electric Furnace Circular.

The Bellis Heat Treating Company

Branford, Connecticut

or

Lavite Limited, Low Moor
Yorks, England

'Round the World With the Wire Industry

(*Continued from page 263*)

for about 70 percent of all imports) amounted to 42,295 metric tons during 1936, as compared with 34,696 tons and 44,606 tons in 1935 and 1934, respectively, advises Assistant Commercial Attache Charles H. Ducote. American participation in this trade declined—from 73.3 percent in 1935 to 62.5 percent in 1936. European shippers bettered their position—from 26.7 percent to 37.5 percent. The European gain was particularly noted in pipe and wire products. It was also evident in sheets, but notwithstanding American producers "still dominate in that classification as a whole."

✦ ✦ ✦

Japanese Government Decides to Suspend Import Duties

IN view of the apprehension created by the present shortage of supply, the **Japanese** Government is planning to suspend import duties on pig iron and steel materials until June 1939 (for two years). It is expected that the bill will be presented to the Diet at an early date, and in addition, that it will provide for the restoration of "former duties" whenever considered necessary.

✦ ✦ ✦

Renewal of Wire Rope Syndicate in Germany

THE Association of **German** Wire Rope Manufacturers, Cologne-Mulheim, has been extended to operate until December 31, 1937. In this connection, business is reported to continue favorably in both domestic and foreign markets.

✦ ✦ ✦

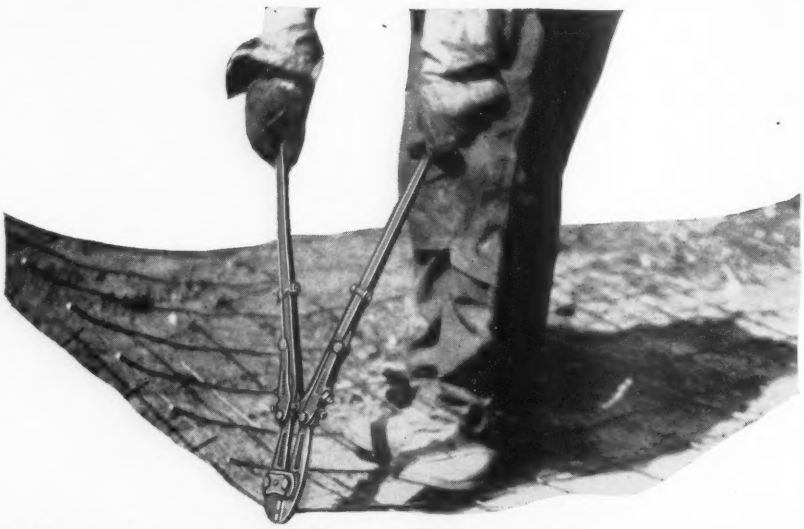
Growing Welding Activity in India

REMARKABLE gains have been evidenced in the use of electric arc welding in **India.** Among other enterprises, it is believed that the railway work shops are becoming interested in automatic welding for certain of their projects. American welding equipment is being well represented in the market in question and it is held possible that not only an increased business in electric arc welding machines will result, but also a heavy increase in imports of American welding electrodes. It is now stated that "all welding electrodes"—as well as welding machines for use on this job, will be imported from the United States.

✦ ✦ ✦

Cuban Domestic Nail Output Important Factor

DOMESTIC Nail output in **Cuba** continued in 1936 to "cut heavily" into the imports of American wire nails. It is understood, however, that quotations on the raw materials have been up-



Aids to the Wire Industry:

PORTER CUTTERS

Indispensable in wire mills for sampling large wire.

In almost universal use by wire fabricators for cutting reinforcing fabric, fencing, spring wire, etc.

Useful in *any* plant, large or small, for all sorts of maintenance and repair work—for cutting bolts, rods, wires, rivets, wire rope, chain; or for splitting deformed or "frozen" nuts.

Remember—every Porter tool is specifically designed and correctly built for the work it is to do. There is a Porter tool for every cutting job up to ¾ in. annealed bolts or ½ in. hardened chain.

Ask your supply house, or write for descriptive literature.

H. K. PORTER, INC., EVERETT, MASS.

ward and that some difficulty has been experienced in obtaining delivery of wire from Europe (believed to be the main source of supply).

+ + +

Greek Government Authorizes Wire Rod Imports From the United States

WITH the apparent expiration of the European Wire Rod Cartel Agreement on December 31, 1936, **Greece** became an open market insofar as wire rod imports are concerned, it is pointed out in a report received from Commercial Attache K. L. Rankin, Athens. Certain difficulties arising from the hesitancy on the part of the various suppliers to sell wire rods to Greek importers—owing to the reported uncertainty of payment through the respective clearing accounts coupled with the fact that Germany for one claimed inability to sell at the price fixed under the Cartel Agreement — caused the Greek Government to authorize the importation of 500 metric tons of wire rods from the United States at a price of $55.15 per ton c. i. f. Piraeus, notwithstanding that Polish wire rods were being currently offered at about $45.00, the report states. Greek importers appear hopeful that they will be able to cover their requirements by imports from Germany eventually, at not more than approximately $45.00 per ton, and thus not find it necessary to pay the higher price for the American rods. Further, they hope also to conclude an agreement with the European Wire Rod Cartel—when and if renewed —whereby they may purchase wire rods at approximately $45.00 per ton c. i. f. Piraeus—as in 1935. Consequently, there appears to be no assurance that American wire rod sales to Greece will continue at current price levels, according to the report.

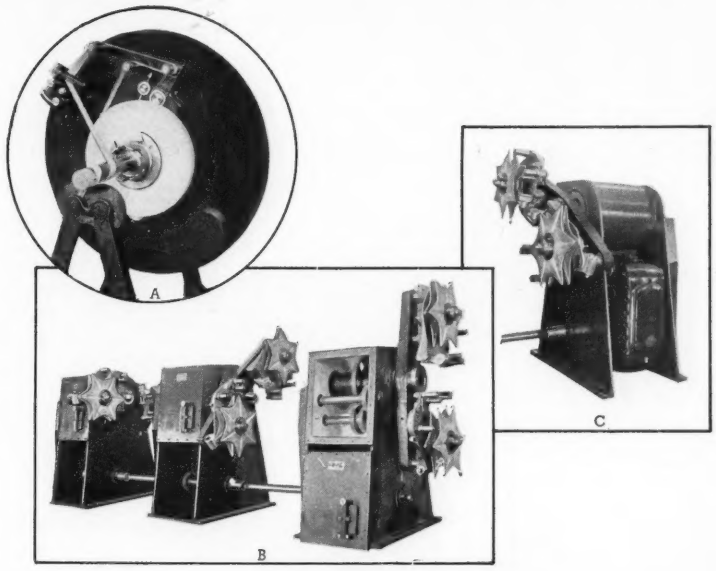
+ + +

Accurate Spring Manufacturing Co. Moves to Larger Quarters

(*Continued from Page 253*)

MR. Charles E. Caestecker is president and Mr. Frank D. Weber is Secretary-Treasurer of the Accurate Spring Manufacturing Company.

ES Taping Machines for Cambric and Paper



TAPING HEADS

TAPING machines can be used for applying paper, (for high tension cables) cambric, rubber filled tape and other materials to cables up to 4" diameter with tapes up to 4" wide.

The taping device can be of the concentric type or the eccentric type where two, three or four taping devices are mounted on one stand. Both types of taping devices are provided with means for pre-determining tape tension.

Tension values are maintained uniform throughout the entire package, as well as during accelerating and decelerating periods. Each taping device is calibrated to permit operator to pre-set tension values.

+ + + + + +

High Speed Insulating Machines For Use With Paper — Cotton — Silk

Saturating and Finishing Equipment For Weatherproof and Code Wire

A Complete Line, Minimum Slip, High Speed Efficient **WIRE DRAWING** Machines for Quality Work.

Take-ups — Spoolers — Coilers

Complete Tinning Equipment

Other Equipment for Producing Wire and Cable

Let us show you what our equipment can do towards cutting production cost and improving quality.

ELEVATOR SUPPLIES COMPANY, Inc.

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420 LEXINGTON AVE., NEW YORK, N. Y.

WORKS
RAHWAY, N. J.

Wire Association Pittsburgh Regional Meeting

THE Pittsburgh Regional Meeting of the Wire Association will be held at the William Penn Hotel, Pittsburgh, Pa., on Friday, May 21st at 7:00 P. M. The Program Committee has arranged for papers to be presented by C. L. Harvey, Chief Metallurgist, Lamson & Sessions Co., Cleveland, Ohio, on the subject of "Cold Heading Wire" and by B. L. McCarthy, Chief Metallurgist, Wickwire Spencer Steel Co., Buffalo, N. Y., on the subject of "The Metallurgy of Steel Wire".

✦ ✦ ✦

FOLLOWING the presentation of each paper, they will be thrown open to discussion, but all comments will be "off the record" in order that those attending may express themselves freely on the subjects presented.

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ADMISSION to the meeting will be by tickets which have been forwarded by mail to all members of the Wire Association. Additional tickets may be obtained by writing the Secretary, Richard E. Brown, 17 East 42nd Street, New York, N. Y.

✦ ✦ ✦

THE Pittsburgh Regional Committee extends an invitation to all non-members of the Association who may be interested in the subjects to be discussed, to attend the meeting. Invitations can be obtained by guests from the Secretary of the Association as noted above.

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Metal Spray Gun Retains Original Character of Wire

A METAL spray gun which, it is claimed, will deposit a metal coating of the same characteristics as the feed wire is announced by Metallizing Co. of America, Los Angeles. This gun, known as the Mogul Metallizer, will operate either with 11 gauge wire or ⅛-inch rod. It deposits metal more rapidly than earlier types and is simpler to operate.

✦ ✦ ✦

THE machining qualities of metal deposited with this gun are said to be superior to that from any other type. For instance, when machining tobin bronze shavings are obtained where formerly the metal came off in powder. Similar results are cited in the case of other metals. The Mogul gun has been particularly successful in applying stainless steel to worn hot oil pump plungers, eliminating many of the troubles experienced when this work was done by welding.

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Exports and Imports of Wire

(*Continued from Page 257*)

gium (956), and Germany (729). Ferromanganese followed in a trade reaching 1,550 tons taken mostly from Norway (681), and Czechoslovakia (550).

✦ ✦ ✦

Ranking Supplier Belgium

IMPORTS from Belgium amounted to 12,516 tons, that country remaining the leading supplier of iron and steel products to the United States during February, its trade being made up chiefly of shrapes (5,669), solid and hollow bars (2,180), 'other' hoops and bands (1,793), nails, tacks, and staples (956), and sheets, skelp, and sawplate (707). Following came British India whose participation (5,863 tons) was all of pig iron, while next was Germany (5,484 tons) sending in mostly 'other' pipe (1,359), rails and track material (829), nails, tacks, and staples (729), barbed wire (699), and sheet piling (512). Then came Sweden whose trade (4,079 tons) was made up chiefly of wire rods (973), solid and hollow bars (469), round iron and steel wire (369), and billets (183). Russia's trade (2,967 tons) was entirely of pig iron. The next supplier of importance—Canada—accounted for 2,357 tons made up chiefly of spiegeleisen (1,230), and pig iron (653).

✦ ✦ ✦

IMPORTS of CARD CLOTHING totaled 22,690 square feet valued at $34,809, with the United Kingdom (21,908 square feet and $33,446), and Belgium (782 square feet and $1,363) the only suppliers. In January, this trade aggregated 24,657 square feet valued at $37,177.

✦ ✦ ✦

WIRE CLOTH AND SCREENING imports totaled 109,481 square feet in comparison with 108,789 suare feet in January and came chiefly from Germany (57,262), the Netherlands (25,173), Canada (19,990), and France. (4,382).

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WIRE HEDDLE receipts aggregated 1,103,000 pieces (1,217,000 pieces in January) and were received from France (552,000 pieces), and Germany (551,000 pieces).

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FOR the third consecutive month, no trade resulted in WIRE FENCING AND NETTING of the galvanized before weaving grade. Of that galvanized after weaving, a total of 160,503 square feet came in from Belgium (150,000), the United Kingdom (6,600), and Germany (3,903), in comparison with a total of 53,000 square feet in January.

✦ ✦ ✦

FOURDRINIER AND OTHER PAPER MAKING WIRE was received to an aggregate of 54,949 square feet (34,357 square feet in January) from Austria (25,543), Germany (14,169), Sweden (11,159), and France (4,078).

✦ ✦ ✦

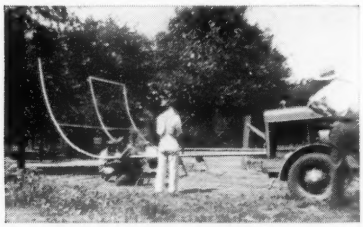
EXPORTS of iron and steel wood screws during February, 1937 totaled 17,598 gross valued at $3,041. Of this total Colombia took 4,405 gross valued at $547; Cuba 3,422 gross valued at $746; Brazil 2,206 gross valued at $284; Chile 1,389 gross valued at $236; Canada 1,255 gross valued at $361; Australia 898 gross valued at $108; Peru 898 gross valued at $191.

✦ ✦ ✦

EXPORTS of brass wood screws during the same month totaled 5,469 gross valued at $2,313. Of this total Brazil took 1,666 gross valued at $439; Panama 1,162 gross valued at $571; Colombia 815 gross valued at $253; Canada 586 gross valued at $405.

New Oklahoma City Bird Cage Is All-Welded

THE Lincoln Park Zoo of Oklahoma City has just completed an all-welded bird cage 75 feet high, 50 feet wide, and 120 feet long. Though the size is not remarkable, the fact that this is one of the first



All-welded bird cage at Oklahoma City. ✦

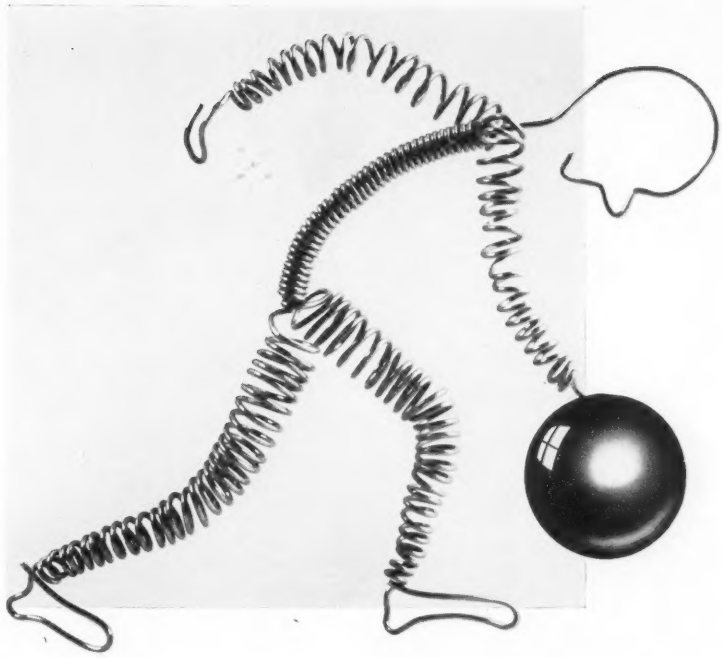
of its kind to be entirely welded in sections on the ground and then raised and welded into place, might prove to be a definite step in opening a new and larger field for welding activities. Working on the job were a P. & H. 150-ampere trailer welder and an old-type acetylene welder. Proof of the higher efficiency of the modern electric welder with the highly improved welding rod over their old-time predecessor, the acetylene welder, is found in the fact that when raising one of the sections, half of which was welded by the P. & H. welder using P. & H. All Position $\frac{3}{16}$" "Smootharc" Welding Rods and half by the acetylene, many of the acetylene welded joints broke during the raising operation while none of those electrically welded were damaged in the least. Economy in operation was definitely shown when it was found that the electric welder ran nearly 18 hours on little over 9 gallons of gasoline.

✦ ✦ ✦

Ratchet Splicer for Wire Fence

SPLICING and wrapping wire fence has always been an awkward and slow job. Splicers of standard design are useless on strands closer than six or eight inches.

(*Please turn to Page 268*)



Wire

Is Right Down Our Alley!

If you want wire that will roll a high score in your plant . . . wire with exactly the physical characteristics and finish you need for smooth production of high-grade products . . . let Keystone make it for you. Our technical staff has straightened out wire problems for a great many manufacturers. Our unexcelled production facilities and laboratory control methods have relieved them of all worry as to uniformity. If you have questions about wire, set 'em up in our alley!

KEYSTONE

STEEL & WIRE CO. **Dept. W., Peoria, Illinois**

HIGH CARBON or LOW CARBON

SAMSON SPRING WIRE

KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Bright . . . Tinned Coppered Annealed Galvanized

● Shown above is a 250-ton Robertson Horizontal Extrusion Press installed for the Garlock Packing Company.

Yet Occupies a FLOOR SPACE of but 4 FEET by 6 FEET

The ROBERTSON EXTRUSION PRESS doesn't hog valuable floor space . . . nor does it gobble profits through operating cost and maintenance. It is as efficient and thrifty to operate as it is versatile. (And its versatility extends to the extrusion of Rods, Tubes and all sorts of miscellaneous Shapes of Lead, Tin, Brittania Metal and other soft alloys.)

Write for details — they're yours without obligation.

John ROBERTSON CO. INC. Pioneers~Since 1858

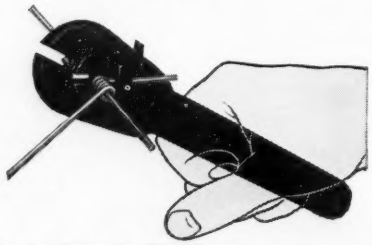
125-37 Water Street Brooklyn, N. Y.

Ratchet Splicer for Wire Fence

(*Continued from Page 267*)

A NEW ratchet splicer has been developed that works as well in close quarters as it does on large mesh, open jobs. It has a long 8″ handle that can be pumped up and down like a pipe wrench without removing from the wire.

✦ ✦ ✦



Ratchet Spicer for Wire Fence. ✦ ✦

A CLEARANCE of one inch is all that is required, so that tight and easy splicing is possible where strands are close or where braces make an ordinary splicer worthless.

✦ ✦ ✦

THE Tri-State Splicer is being distributed through hardware stores and fence dealers. Operation of the splicer is difficult to describe, but easy to understand if the tool can be examined. So the manufacturers are packing a display card with each dozen. Descriptive literature is in preparation, and will be sent on request. It is made by the **Tri-State Mfg. Co.**, 1212 Jackson St., Toledo, Ohio.

✦ ✦ ✦

Welding Job at Golden Gate, Including 500,000 Tack Welds, Nears Completion

THE Golden Gate Bridge of San Francisco Bay, along with its many other "super-sized" construction operations, is the site of one of the largest shop and field welding operations on the Pacific Coast. This job, which covers the fabrication of "steel fabric trusses" and the welding of these trusses to floor stringers on the bridge, is being handled by twelve P. & H. Hansen Smootharc Welders. The Concrete Engineering Company which is under contract to fabricate, deliver and place these trusses in the bridge, has divided its field of welding activity into two distinct oper-

ations. Operation "A" includes all of the shop work entailed in fabricating approximately 1,800 tons of welded trusses. About six months' time was required for this work which was done by six 300-ampere motor-driven portable Hansen Smootharc Welders, working in three shifts. Throughout the entire course of this operation in the shops, there was not a single delay due to equipment trouble.

✦ ✦ ✦

Welding on Golden Gate Bridge.

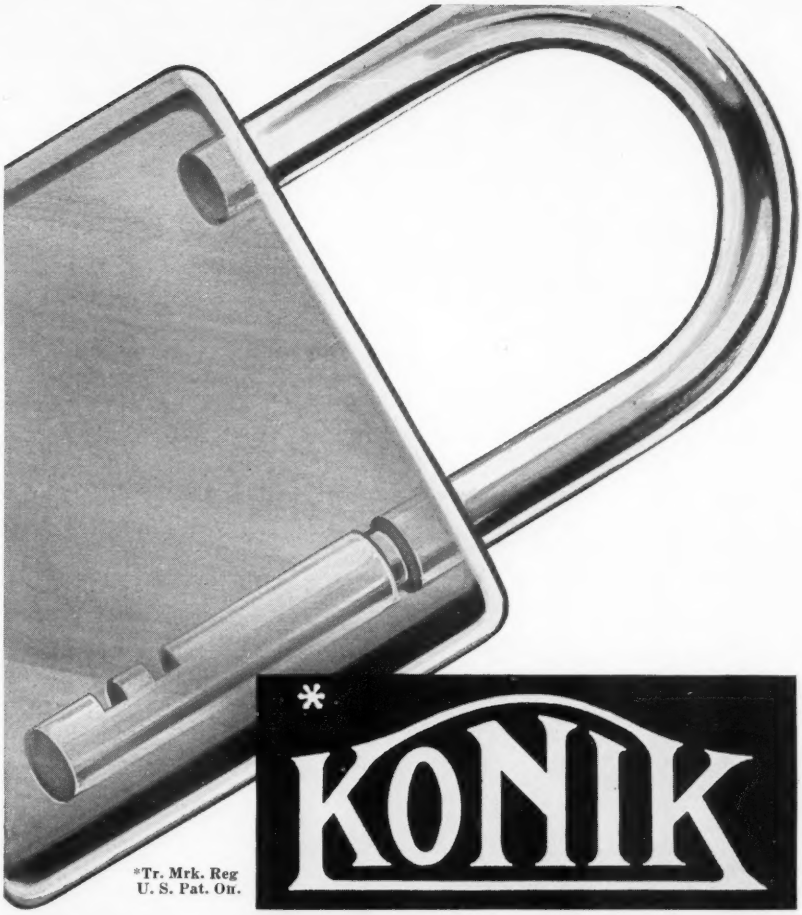
✦ ✦

OPERATION "B," which includes all field work, covers the tack welding of these trusses to floor stringers in the bridge. The trusses have a depth of approximately 5″ and are spaced 6″ on centers. Over half a million 1″ tack welds were required during a period of about 75 days. The tack welding operations were in the hands of six 300-ampere portable gas-driven P. & H. Hansen Smootharc Welders, one of which is shown in the above photograph.

✦ ✦ ✦

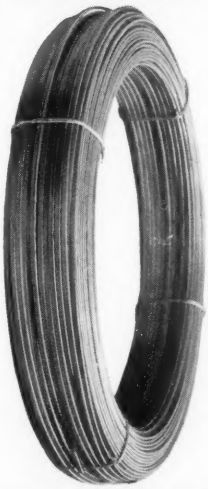
WELDING Service Sales, Inc., of San Francisco, has the contract for furnishing all equipment, electrodes and supplies, and also for doing the tack welding in the field. Tack welding reinforcing steel, rather than the old-fashioned hand-tying method has long been recognized as the most suitable method for tying reinforcing steel on jobs of any great size.

The 1937
Wire Association Meeting
Will be Held at
Atlantic City, N. J.
October 18th to 22nd, 1937



*Tr. Mrk. Reg
U. S. Pat. Off.

ADDS NEW SECURITY TO LOCKS



A case so hard that it defies file and hacksaw combined with a core tough enough to hang on through twisting torture makes "Konik" the ideal steel for locks. It works readily, stands extreme deformations, machines well, cuts fabrication cost. In solid, liquid, or gaseous carburizing mediums, as best suits your job, "Konik" takes a deeper, quicker case.

Either with or without added carbon it responds splendidly to heat treatment. Not a stainless steel, this patented steel containing copper, nickel, and chromium resists rust and corrosion far better than ordinary steels. For superior properties at competitive cost, discuss your requirements with our metallurgists. "Konik" is available in rods and wire.

Through its special facilities in producing manufacturers wire CONTINENTAL endeavors to supply manufacturers with just the right combination of analysis, temper and finish to speed production, reduce rejections, and improve their product. Regularly supplied in a variety of shapes. Put up in coils, or straightened and cut, in a wide range of sizes. Our metallurgists may be able to show you the way to better products at lower cost. We invite your inquiries.

CONTINENTAL STEEL CORPORATION
PLANTS AT CANTON, KOKOMO and INDIANAPOLIS

Manufacturers of

Billets and Wire Rods; Bright Basic, Annealed, Galvanized and "Konik" Wire; Nails, Staples; and Kindred Products.

Lawn, Chain-Link, Diamond Mesh, Farm and Poultry Fence; Barbed Wire and Bale Ties; Gates and Posts.

Black, Galvanized, Galvannealed, and Special Coated Sheets; Galvanized and "Seal of Quality" Roofing.

WARNER COMPANY
Lime
Bell Mine
Products
BELLEFONTE DIVISION

Choose and Use

Bell-Mine Pulverized Lime

In Wire Drawing

It is uniformly burned, high in calcium oxide content, pure and free from grit.

MANUFACTURED BY

American Lime & Stone Company

BELLEFONTE, PA.

Warner Company.

BELLEFONTE DIVISION

WHOEVER UNDERSTANDS GERMAN

Should Read

"Draht-Welt" (Wire World)

A weekly for the wire industry and related lines.

Subscription price: Rm. 6.50 quarterly

Sample copies free on request from:

Martin Boerner — Verlag

Halle — Saale

Germany

A. S. T. M. Methods of Chemical Analyses of Metals

FOR the first time the A. S. T. M. has issued a publication giving under one cover all of its methods of chemical analyses of the ferrous and non-ferrous metals. These include four methods for analyzing ferrous metals, twelve for non-ferrous metals and alloys, three methods of quantitative spectro-chemical analysis of non-ferrous metals. Included in the volume are the greatly amplified and modernized methods of chemical analysis of steel, cast iron, open-hearth iron and wrought iron. These new combined methods were developed to provide methods for the determination of important elements in plain and alloy steels and irons, and the new methods comprise an up-to-date treatise on this subject. Methods for the sampling and analysis of several ferro-alloys are included.

✦ ✦ ✦

THE section on non-ferrous metals embraces methods for the analysis of bearing metals, brasses and bronzes, aluminum alloys, pig lead, slab zinc, nickel, electrical-resistance alloys and silver solders.

✦ ✦ ✦

COPIES of this 250-page publication can be obtained from A. S. T. M. Headquarters at $2.50 in cloth binding; $2 in heavy paper cover.

✦ ✦ ✦

Industrial Wiring Guide

INDUSTRIAL Giude for the Proper Selection of Wire and Cable, a 32 page publication designed to help clarify present day practice involving the selection and application of wire and cable. It is published with a view to serve engineers who are confronted with ticklish wiring problems, more as a means for reviewing the available types of wires and cables to meet conditions, than as a substitute for personal diagnosis and treatment of wiring problems.

✦ ✦ ✦

FACTORS affecting the selection of wire and cable and a treatise on the importance of up to

date wiring design in relation to avoiding industrial headaches are discussed. Colored lay-outs illustrate typical power supply circuits and tables covering practical limitations to be considered are included in these discussings.

✦ ✦ ✦

NINE charts for recommending insulation and protective coverings to meet exposures and conditions of use are so arranged as to make for ease in selecting the wire or cable for different industrial circuits. For your copy, write to the Anaconda Wire and Cable Company, 25 Broadway, New York, N. Y.

✦ ✦ ✦

Micrometer Tipping Service

CARBOLOY Company, Inc., manufacturers of cemented carbides, announces a special micrometer tipping service available to all micrometer users. By means of this service the micrometer user sends his micrometer to the Company who tips with carbides the wear points at the ends of the anvil and spindle. The micrometer is then accurately adjusted and returned to the owner, ready for immediate use.

✦ ✦ ✦

IT is stated that the micrometers will hold to a closer degree of accuracy during a period of use that averages at least 50 times longer life than with regular steel micrometers without such tips.

✦ ✦ ✦

FORMERLY, these tips were applied principally on micrometers used as "masters" to check other gages. However, because of the new, low price recently established, the use of carbide tips on micrometers has been extended to practically all applications. One standard price for tipping all micrometers, regardless of size, has been established.

✦ ✦ ✦

To heat – circulate – agitate Pickle Liquor

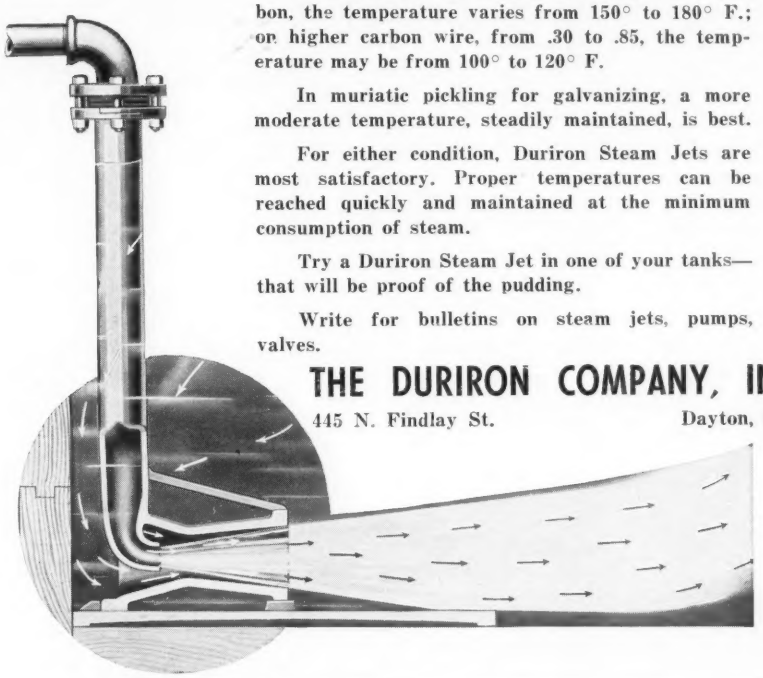
In sulphuric acid cleaning of rod up to .25 carbon, the temperature varies from 150° to 180° F.; on higher carbon wire, from .30 to .85, the temperature may be from 100° to 120° F.

In muriatic pickling for galvanizing, a more moderate temperature, steadily maintained, is best.

For either condition, Duriron Steam Jets are most satisfactory. Proper temperatures can be reached quickly and maintained at the minimum consumption of steam.

Try a Duriron Steam Jet in one of your tanks—that will be proof of the pudding.

Write for bulletins on steam jets, pumps, valves.



THE DURIRON COMPANY, INC.
445 N. Findlay St. Dayton, Ohio

NORBIDE ABRASIVE . . .

A popular choice of makers and users of carbide dies for economical shaping, ripping and finishing.

NORTON COMPANY
WORCESTER, MASS.

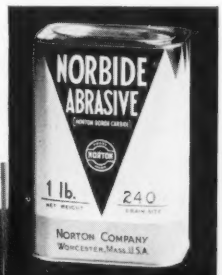


Photo courtesy of Union Wire Die Corp.

Measuring Instruments
Automatic Controls
Heat-Treating Furnaces

FOR WIRE MAKERS & USERS

Equipments of outstanding reliability and sturdiness, widely used by manufacturers of ferrous and non-ferrous wire, wire products etc.:

ELECTRICAL MEASURING INSTRUMENTS

Manually-Operated Indicators
Micromax Recorders & Controllers
Speedomax Recorder
Metermax Combustion Control
Centrimax Flow Meter
Galvanometers Potentiometers
Test Sets & Equipments Bridges

ELECTRIC HEAT-TREATING FURNACES

Vapocarb-Hump Hardening Furnaces
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LEEDS & NORTHRUP COMPANY
4974 STENTON AVENUE PHILADELPHIA PA.
LEEDS & NORTHRUP

J-ENT-0600 (1)

BALLOFFET

The Quality Diamond Dies
Since 1870

Balloffet Dies and Nozzle Co., Inc.

45-47 Adams Street Guttenberg, N. J.

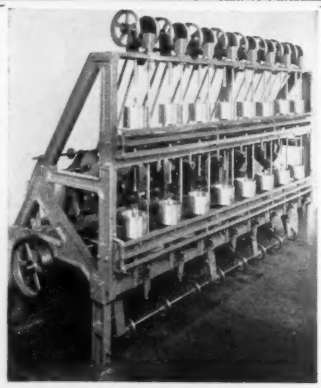
LEWIS MODERN WIRE STRAIGHTENING AND CUTTING MACHINES

EQUIPPED WITH

Fully Enclosed Sliding Gear Transmissions
Providing a Range of Speeds and Feeds for
Most Efficient Operation on All Kinds of Wire

Machines for Handling Wire Sizes From 1/32" to 3/4" — Write for Bulletin

THE LEWIS MACHINE COMPANY
3440 EAST 76 ST. — CLEVELAND, O.



Aimco New Wire Insulating Machine

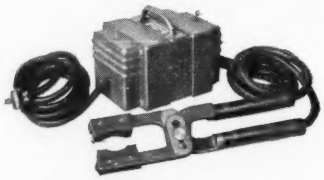
Simple in construction, high speed production, moderate in price, and costs little to operate. Ball bearings throughout, helical gears, Vee belt spindle drives, minimum floor space.
Versatile—applying cotton, silk, paper, and transparent film such as "Cellophane", with equal facility and at high speeds.
Production figures gladly furnished.

EST. 1855 AIMCO INC. 1915
"American" INSULATING MACHINERY COMPANY
517 West Huntingdon St.
PHILADELPHIA PENNSYLVANIA USA

New Large Thermo-Grip Electric Pliers

THE No. 5 Model Ideal Electric Pliers was introduced several months ago as a new and novel type of electrically heated soldering tool for small soldering work.

✦ ✦ ✦



Thermo-grip Electric Pliers. ✦ ✦

SHORTLY after this tool was placed on the market, there appeared a demand for a similar tool, which would handle larger work, and as a result the Ideal Commutator Dresser Company, 1936 Park Avenue, Sycamore, Illinois, has developed the Ideal No. 10 Electric Pliers, which will do work over twice the size of that for which the No. 5 is used.

✦ ✦ ✦

THE larger size Pliers are used for soldering lugs up to 1050 amp. or sweating pipe fittings up to 2½" diameter, under continuous operation. When used only intermittently, the No. 10 Pliers will handle pipe or fittings up to 4" in diameter.

✦ ✦ ✦

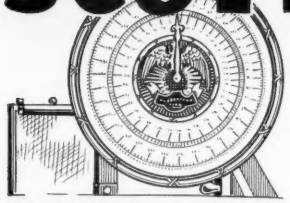
IDEAL Electric Pliers are distinctly different from all other soldering tools in the following ways: They sweat joints without unsweating adjacent connections, they hold work firmly while soldering, they heat the work evenly from both sides, and they eliminate open flame hazards.

✦ ✦ ✦

THE line current from which they operate is reduced to a harmless low voltage so no electric shock is possible.

All wire production men are cordially invited to attend the Pittsburgh Regional Meeting of the Wire Association at the William Penn Hotel on Friday, May 21, 1937 at 7:00 P. M.

SCOTT



HORIZONTAL & VERTICAL TESTING MACHINES FOR WIRE

HENRY L. SCOTT Co.
PROVIDENCE, R.I.

TESTERS

Dies for
High Speeds
Long bearing Dies
Short bearing Dies
Special bearing Dies

FAMOUS
WIRE DRAWING DIAMOND DIES

VIANNEY

250 E. 43rd St. • New York

Largest Stocks in U.S.A.
Quickest Deliveries
Safest Guarantees
Best Selections
Lowest
Costs

Index to A.S.T.M. Standards and Tentative Standards

THE American Society for testing materials announces the latest edition of the Index to A. S. T. M. Standards and Tentative Standards. This 120-page publication gives information on all of the 796 standards as of January 1, 1937. The Index is of service to anyone wishing to ascertain whether the Society has issued standard specifications, test methods, or definitions covering a particular engineering material or subject and it is of help in locating the standards in the volumes where they appear.

✦ ✦ ✦

ALL items are listed in the Index under appropriate key-words according to the particular subjects they cover. As a convenience a list is given of the specifications and tests in numeric sequence of their serial designations.

✦ ✦ ✦

COPIES of this publication are furnished without charge on written request to A. S. T. M. Headquarters, 260 S. Broad St., Philadelphia.

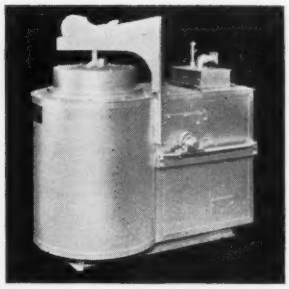
✦ ✦ ✦

Bridgeport Brass Plans Improvement in Wire, Rod and Tube Mills

IN a recent report of President Day of the Bridgeport Brass Company, he stated:

✦ ✦ ✦

"THE progressive increase in volume of sales of your company during the past three years and existing competitive conditions in the brass industry have necessitated consideration of expansion and modernization of its facilities. Your directors have given careful consideration to this expansion program, and as a result of comprehensive study by outside engineers, have voted to proceed with the design and construction of a new rolling mill, a mill office and a laboratory and certain additions to and improvements of the wire and rod mills and the pipe and tube mills."



Lindberg CYCLONE Tempering Furnace

Revolutionary advance in furnace design which gives new high efficiency in production.

Cyclone action forces heat directly through the densest charge, producing increased speed and uniformity in tempering.

Cyclone construction withstands unusual abuse, reducing production delays and maintenance costs to a minimum.

Electric and Gas Fired Types with Precision Control. Bulletins on request.

Lindberg Engineering Co.
223 UNION PARK COURT CHICAGO, ILLINOIS

Offices In Principal Cities
CANADA: WILLIAMS & WILSON, Ltd.

Premier
TRADE MARK REG. U.S. PAT. OFF.
Diamond Dies

Premier Diamond Dies are made of specially selected stones shaped and formed for every requirement. These dies are cased so as to form a tool that is virtually a single seamless unit.

Premier Dies are so constructed that they will draw to uniform size under heavy pressure without flawing or breaking.

PREMIER

DRIVER-HARRIS COMPANY
HARRISON - NEW JERSEY

New Detroit Offices and Plant for Firth Sterling Steel Co.

DUE to increased demands which have rendered the present quarters inadequate, the Firth-Sterling Steel Company are building large modern offices, a warehouse, and carbide sintering plant at Chicago and Oakman Boulevards, Detroit, Michigan.

THE new building will double their present capacity and enable them to better care for the ever-growing volume of business in the high speed steels, tool and die steels, stainless steels, and the complete line of sintered carbide cutting tools and blanks, as well as dies for wire and tube drawing. Extensive building operations are also going on at their main plant in McKeesport, Pa.

THE NEW S & H NO. 2½ UNIVERSAL SPRING COILER

(Segment Type)

Developed to Meet the Rigid Requirements of the High Production Shop

WRITE FOR COMPLETE INFORMATION TODAY.

SLEEPER & HARTLEY, INC.

Worcester, Massachusetts

"You Can Fool Some of The People All The Time"

Blah, Blah, Black Sheep—have you any BULL?
Yes, sir—yes, sir, three bags full.
Some for the Steelmen, some for the boss,
And some to make myself believe I get my stuff across.

But it doesn't just go in selling today. The steel mill Chemists and Superintendents know full well, the day is past when you can "push over" diluted Inhibitors, with 50 to 75% of useless ingredients.

The INHIBITOR is now the least of their troubles . . . He knows we produce the strongest Inhibitor offered to the steel industry. Our INHIBITOR pays for itself.

We Can Reduce Your Inhibitor Costs Fifty Percent (50%) Per Month

We Have Proven This In Many Plants

May we assist you in working out some of your problems in your cleaning department? We produce GOOD INHIBITORS exclusively.

"NEP"

THE WILLIAM M. PARKIN CO.

Chemical Engineers to the Steel Industry
Pittsburgh, Pa.

Wire and Cable in the Aircraft Industry

(*Continued from Page 240*)

THE 1937 type automatic "robot" pilot is aboard each of the Mainliners, adding still another modern use for perfected aircraft cable controls. In addition to the miles of wire and cables used on the Mainliner fleet, United Air Lines has pointed out the importance in having all air terminals adequately fenced with wire fences. As an example, improvements that will be made in 1937 on the Chicago Municipal Airport include the installing of two and a half miles of fence at a cost of $20,000. Proper fencing at airports insures the safety of airplanes, passengers and visitors. There are 200 cities in the United States that are served by air lines today and the majority of these employ wire fencing.

✦ ✦ ✦

Respirators

RECENTLY developed, and approved by the United States Bureau of Mines, is a respirator for use particularly in Type "A" dusts (those tending to produce silicosis). This bears the name of Cesco No. 90 Healthguard Respirator and is an entirely new development.

✦ ✦ ✦

THE filtering element removes all dust, even of microscopic fineness, yet allows free passage of air. There is only one filtering surface, of large area; and a supersensitive outlet valve permits no inside air pressure. Hence users report no apparent resistance to easy breathing.

✦ ✦ ✦

OF equal importance with the filter, as a precaution against breathing dust, is the seal at the facial contour. This seal is effected with the aid of a soft metal band which serves the additional purpose of so reducing the headband pressure that it is no longer noticeable.

Now Ready
The 1937 Wire Buyers' Guide and Year Book of the Wire Association
Price $5.00 per Copy

American Society for Testing Materials New Standards Committee A-1 on Steel

AT the well-attended series of subcommittee meetings of A. S.T.M. Committee A-1 on Steel held during Committee Week in Chicago, March 1-4, a number of proposed new standards were discussed and recommendations on these, together with other actions on existing standards, were reported to the meeting of the main committee on Wednesday morning.

✦ ✦ ✦

INCLUDED in the existing tentative specifications which were recommended at the meeting for adoption as official standards are those covering the following materials: Forged or Rolled Steel Pipe Flanges for General Service (A 181), Seamless Cold-Drawn Heat-Exchanger and Condenser Tubes, and Still Tubes for Refinery Service (A 179) and (A 161) and Electric-Resistance - Welded Steel and Open-Hearth Iron Boiler Tubes (A 178). Other tentative specifications which will be submitted to letter ballot of the committee for recommended adoption as standard cover Fabricated Steel Bar or Rod Mats and Welded Steel Wire Fabric for Concrete Reinforcement, A 184 and A 185.

✦ ✦ ✦

Proposed New Specifications

SEVERAL new specifications which have been in course of development during the past year were studied at the Steel Committee meetings and are to be referred to committee letter ballot for recommendation to A.S.T.M. as new tentative standards. Products covered by some of these new specifications include: intermediate alloy seamless steel still tubes and intermediate alloy seamless heat-exchanger and condenser tubes. These are proposed as companion specifications to existing A.S.T.M. items for similar carbon and alloy steel products. The committee on boiler steels reported progress on a very active program which includes four new specifications covering carbon steel, low carbon nickel steel, molybdenum steel, and chromium-

(*Please turn to page 276*)

Learn about PARALAN

Paralan will give your finished wire and wire products protection from atmospheric corrosion in the mill and in shipping. Paralan-coated wire can be spot welded or soldered without cleaning. Also, Paralan leaves surfaces in good condition for all types of finishes—enameling, japanning, lacquering, plating, etc.

Write for further information. We may be able to solve your difficulties.

AMERICAN LANOLIN CORP.
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CARBOLOY COMPANY, INC., Detroit, Michigan, manufacturers of cemented carbide tools, dies and wheel dressers, announce that effective March 22, their Chicago office has supplemented its service to the midway territory with an additional district representative, Mr. F. J. Staroba.

✦ ✦ ✦

MR. STAROBA will cover the district comprising Southern Illinois, Missouri, and Kansas, replacing Mr. Deeds who has been assigned to Indiana and Kentucky. Mr. Staroba has been connected with the Chicago office for the past five years.

American Society for Testing Materials New Standards

(*Continued from Page 275*)

manganese alloy steel plates of flange quality for locomotive boiler shells and of flange and firebox qualities for stationary boilers and other pressure vessels.

✦ ✦ ✦

AN important new specification for iron and steel filler metal (arc welding electrodes and gas welding rods) was presented at the meeting and will be balloted upon by the committee for approval as a new standard. This was developed in joint cooperation with representatives of the American Welding Society.

✦ ✦ ✦

A NUMBER of questions of importance are being investigated by various divisions of Committee A-1. One of these involves the inclusion of surface conditioning requirements in the Tentative Specifications for Structural Nickel Steel. Subcommittee II in charge of this work has in hand, also, recommendations for standard specifications for steel sheet piling. An interesting development in the work of the subcommittee on steel tubing and pipe is the proposal to eliminate the use of Birmingham wire gage in the tube specifications and the substitution therefor of a system of designating the wall thickness by decimals of an inch. A special subcommittee was appointed to develop recommendations at the June meeting concerning this matter and also the question of coordinating wall thickness tolerances in accordance with the change in method of designation. The committee has under preparation a new specification for alloy-steel boiler and superheater tubes for high pressure and high-temperature steam service.

✦ ✦ ✦

ONE of the actions taken at the meeting, subsequently to be submitted to letter ballot, involved the withdrawal of the List of Specifications for Steel Suitable for Fusion Welding (A 151-35) with the recommendation that the existing specifications covering materials offered for fusion welding be revised to incorporate specific requirements for welding or to include a statement that the material is suitable for welding.

✦ ✦ ✦

THE committee working on specifications for bolting, which last year developed the Tentative Specifications for Alloy-Steel Bolting Materials for High Pressures and Temperatiures to 1100 F. (A 193-36 T), plans to study two new drafts of the standard which will contain in tabular form those alloys felt to be of most practical use. These drafts will be considered by the committee and discussed at a meeting to be held in May.

✦ ✦ ✦

THE existing standard specifications A 158 covering seamless alloy-steel pipe for high-temperature service are to be redrafted as a new tentative specification and because of the wide usage of the carbon - molybdenum alloy steel composition, especially by the power industry, in ranges of 900 to 1000 F., this grade will be removed from the specification and covered in a proposed new tentative standard. In the revised specifications A 158, three alloys are to be deleted because of the lack of demand and five new alloys are to be added.

✦ ✦ ✦

Officers of Committee A-1:

Chairman: H. H. Morgan, Manager, Rail and Fastenings Dept., Robert W. Hunt Co.

Secretary: H. P. Bigler, Director, Rail Steel Bar Assn.

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New Booklets on Inhibitors

NEW and revised booklets, announced by the Grasselli Chemicals Department, E. I. du Pont de Nemours & Company, include a new booklet on Nogas and inhibitors for pickling iron and steel.

✦ ✦ ✦

IN the new booklet on Nogas, the function and application of this non-foaming agent are explained. The booklet also carries a list of chemicals for the iron and steel industry. The booklet on inhibitors refers to the functions of an inhibitor and discusses briefly the powdered and liquid types.

✦ ✦ ✦

Hudson Wire Co.

DIRECTORS of the Hudson Wire Company declared a cash bonus amounting to two weeks' pay to employees of the Winsted Division early in December and made payment December 22.

✦ ✦ ✦

THE Winsted plant, acquired in 1931, is engaged in the manufacture of insulated magnet wire, specializing particularly in the very fine sizes of enameled and silk covered wire used in radio and coil manufacturing. Despite generally adverse trade and business conditions prevailing during the period since acquisition of the Winsted plant, the company has made a good showing from the start, especially during the past two years.

✦ ✦ ✦

RECENTLY the plant has been completely remodeled and is now equipped with the most improved machinery and tools capable of large production capacity.

✦ ✦ ✦

O. F. BITZER, a pioneer in the electrical wire industry, and formerly general superintendent of the Acme Wire Company of New Haven is manager of the Winsted plant. George W. Oliver, for many years connected with the Gilbert Clock Company, is office and sales manager.

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Index to Advertisers

A

Ambassador Hotel 262
American Chemical Paint Co. 276
American Insulating Machinery Co. 272
American Lanolin Co. 275
American Lime & Stone Div. of Warner Co. 270

B

Balloffet Dies & Nozzle Co., Inc. 272
Bellis Heat Treating Co., The 263
Broden Construction Co. 277

C

Carboloy Company, Inc. 225
Cleveland Tramrail Div. of the Cleveland Crane & Engr'g. Co. 261
Cochaud Wire Die Corp. 277
Continental Steel Corp. 269

D

Driver-Harris Co. 273
Duriron Company, Inc., The 271

E

Electric Furnace Co., The ..... Back Cover
Elevator Supplies Co., Inc. 265

F

Farrel-Birmingham Co., Inc. 259
Firth Sterling Steel Co. 234

G

Glader, Wm., Machine Works 260
Gould, William 277

H

Hallden Machine Co., The 277
Hudson Wire Company 228

K

Kelly Wire Die Corp. 277
Keystone Steel & Wire Co. 267

L

Lancaster, Allwine & Rommel 275
Leeds and Northrup Co. 272
Lewis, K. B. 277
Lewis Machine Co. 272
Lindberg Engineering Co. 273
Lyon-Vail Machine Co., Inc. 227

M

Magnus Chemical Co. 276
Micro Products Company 257
Miller, R. H., Co. Inc. 275
Morgan Construction Co. 231

N

Norton Co. 271

P

Parkin, Wm. M. & Co. 274
Pittsburgh Steel Co. 230
Platt Brothers & Co. 277
Porter, H. K., Inc. 264

R

Republic Steel Corp. 250
Robertson, John, Co., Inc. 268
Ruesch Machine Co., H. J. 277
Rusch Wire Die Corp. 275

S

Schuyler, W. A. 277
Scott, Henry L., Co. 273
Scudder Foundry & Machine Co., E. J. 277
Seneca Wire & Mfg. Co. 277
Shuster, F. B., Co., The 277
Sleeper & Hartley, Inc. 274

T

Thomson-Judd Wire Machinery Co. 277
Twitchell, E. W., Inc. 277

U

Union Wire Die Corp. 232

V

Vanadium Alloys Steel Co. 233
Vaughn Machinery Co. ..... Front Cover
Vianney Wire Die Works 273

W

Warner Company 270
Waterbury Farrel Fdry. & Mach. Co. 229
Watson Machine Co. ..... Inside Back Cover

Y

Youngstown Sheet & Tube Co., The ..... Inside Front Cover

BUYERS' GUIDE

For more complete information, consult the annual Directory, Index & Buyers' Guide.

ABRASIVES—
Norton Co., Worcester, Mass.

ANNEALING POTS AND BOXES
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.

ANODES—Nickel
Seymour Mfg. Co., Seymour, Conn.

ANTI-RUST—
Magnus Chemical Co., Garwood, N. J.

ARMORING EQUIPMENT
Amer. Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
New England Butt Co., Providence, R. I.
Seymour Mfg. Co., Seymour, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

BAKERS—Rod and Wire
Lindberg Engineering Co., Chicago, Ill.
Morgan Construction Co., Worcester, Mass.
Morrison Engineering Co., Cleveland, O.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CEMENT FLOOR CLEANER—
Magnus Chemical Co., Garwood, N. J.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Magnus Chemical Co., Garwood, N. J.
Parkin Co., The Wm., Pittsburgh, Pa.

CLEANERS—Hand and Metal
Magnus Chemical Co., Garwood, N. J.

CLEANING & PICKLING EQUIPMENT
Broden Construction Co., Cleveland, O.
Duriron Co., The, Dayton, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
H. J. Ruesch Machine Co., Newark, N. J.

CONDUITS—Iron and Steel
Youngstown Sheet & Tube Co., Youngstown, Ohio.

CONTROLS—Automatic
Leeds & Northrup Co., Philadelphia, Pa.

CRANES—Block Stripping
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

CRANES—Cleaning House
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

CRANES—Electrical Traveling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

CRANES—Wire Mill
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTERS—
Porter, H. K., Inc., Everett, Mass.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIES—Diamond
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Co., New York, N. Y.
Driver Harris Co., Harrison, N. J.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Union Wire Die Corp., Stamford, Conn.
Vianney Wire Die Works, New York, N. Y.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Corp., New York.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Union Wire Die Corp., Stamford, Conn.
Vianney Wire Die Works, New York, N. Y.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Union Wire Die Corp., Stamford, Conn.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.

BUYERS' GUIDE, Continued

Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Union Wire Die Corp., Stamford, Conn.
Vanadium Alloys Steel Co., Pittsburgh, Pa.
Vianney Wire Die Works, New York, N. Y.

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H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.

ENGINEER—Consulting Wire Mill
Gould, William, New York, N. Y.
Lewis, Kenneth B., New York, N. Y.

EQUIPMENT—Galvanizing
Meaker Company, The, Chicago, Ill.

EQUIPMENT—Insulation Testing
Leeds & Northrup Co., Philadelphia, Pa.

EYELETS—Brass or Zinc
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FURNACE CONTROLS—Combustion
Leeds & Northrup Co., Philadelphia, Pa.

FURNACE CONTROLS—Draft
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FURNACES—Annealing
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Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engineering Co., Chicago, Ill.

FURNACES—Hardening and Tempering
Electric Furnace Co., Salem, O.
Leeds & Northrup Co., Philadelphia, Pa.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
John Robertson Co., Brooklyn, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

FURNACES—Normalizing
Leeds & Northrup Co., Philadelphia, Pa.

FURNACES—Wire, Strip and Sheet
Electric Furnace Co., Salem, O.
Lindberg Engineering Co., Chicago, Ill.
Surface Combustion Co., Toledo, O.

GALVANIZING—Special Process
Meaker Company, The, Chicago, Ill.

GEARS—Wire Mill
Farrel-Birmingham Co., Ansonia, Conn.

GRINDERS—Roll
Farrel-Birmingham Co., Ansonia, Conn.
Norton Co., Worcester, Mass.

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Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

HOISTS—Electric Traveling
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Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

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Parkin Co., The Wm., Pittsburgh, Pa.

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LATHES—Die Reaming
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Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Warner Company, Bellefonte, Pa.

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Magnus Chemical Co., Garwood, N. J.

LUBRICANTS—Wire Drawing
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MACHINERY—Braiding
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MACHINERY—Brazing
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MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
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Watson Machine Co., Paterson, N. J.

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Watson Machine Co., Paterson, N. J.

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W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

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John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
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H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
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Meaker Co., The, Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

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H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

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American Insulating Machinery Co., Phila.
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Watson Machine Co., Paterson, N. J.

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MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
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MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Material Handling
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MACHINERY—Measuring Wire & Cable
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New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works Co., Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.
Elevator Supplies Co., Inc., Hoboken, N. J.

MACHINERY—Pointing
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Elevator Supplies Co., Inc., Hoboken, N. J.
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Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Ansonia, Conn.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.

MACHINERY—Rolling Mill
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Elevator Supplies Co., Inc., Hoboken, N. J.
Farrel-Birmingham Co., Ansonia, Conn.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
Farrel-Birmingham Co., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Farrel-Birmingham Co., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Broden Construction Co., Cleveland, O.
Elevator Supplies Co., Inc., Hoboken, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Special—Combination Machine for Drawing, Cutting-to-length, Straightening and Reeling Bars from Coil in One Operation (Shumag Type)—
W. A. Schuyler, New York, N. Y.

BUYERS' GUIDE, Continued

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Elevator Supplies Co., Inc., Hoboken, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Halliden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
Elevator Supplies Co., Inc., Hoboken, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Wire
Henry L. Scott Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Elevator Supplies Co., Inc., Hoboken, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.

MACHINERY—Wrapping Wire
W. A. Schuyler, New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MONORAIL SYSTEMS—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

OVENS—Annealing or Drying
Lindberg Engineering Co., Chicago, Ill.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

POTS—Annealing, Case Hardening and Tempering
Lindberg Engineering Co., Chicago, Ill.

POTS—Lead Melting
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

PYROMETERS—
Leeds & Northrup Co., Philadelphia, Pa.

RECORDERS—
Leeds & Northrup Co., Philadelphia, Pa.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Morrison Engineering Co., Cleveland, O.

RODS—Wire—Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROLLS—
Farrel-Birmingham Co., Ansonia, Conn.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Republic Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

SKIN PROTECTOR—
Magnus Chemical Co., Garwood, N. J.

SOAPS—Industrial and Wire Drawing
Magnus Chemical Co., Garwood, N. J.
R. H. Miller Co., Homer, N. Y.

STRIP—Brass, Zinc and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TESTERS—Wire
Henry L. Scott Co., Providence, R. I.

TOOLS—
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Co., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, Ohio

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Company, Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel and Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Seymour Mfg. Co., Seymour, Conn.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE AND STRIP—Brass, Zinc
Platt Bros. & Co., The, Waterbury, Conn.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

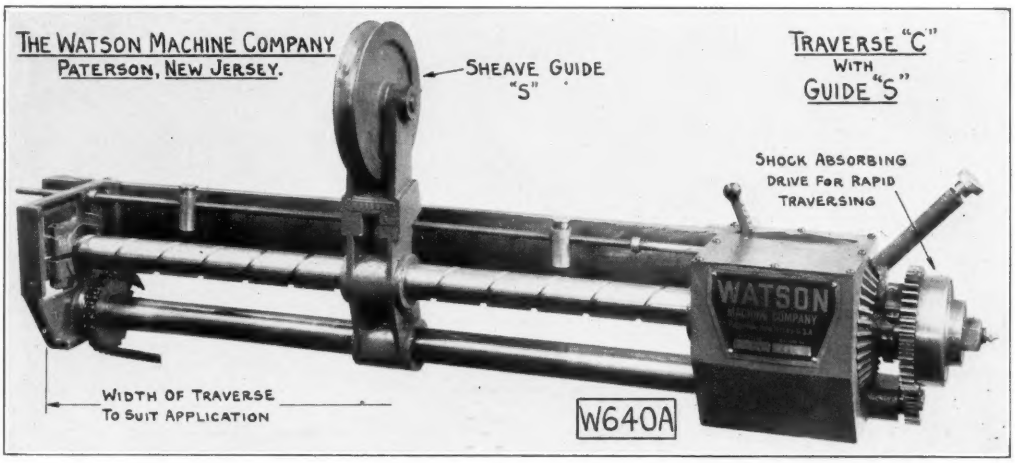
The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON, NEW JERSEY, U. S. A.

TRAVERSES "C"

BULLETIN 012031

ELECTRICAL WIRE AND CABLE, WIRE ROPE AND CORDAGE MACHINERY

TRAVERSES "C" *and* GUIDES



This style of Traverse is intended for use on Takeups for Reels of 60″ diameter or less, and is capable of the high tensions usually present on Wire Rope Stranders.

Adjustments of end points **(for width of reel)**, lay and transfer of power, to hand control, are quickly and easily made, while stationary or operating. Lay is varied by Swing Lever at side of box having spring lock handle, and has a variation ratio of 20 to 1.

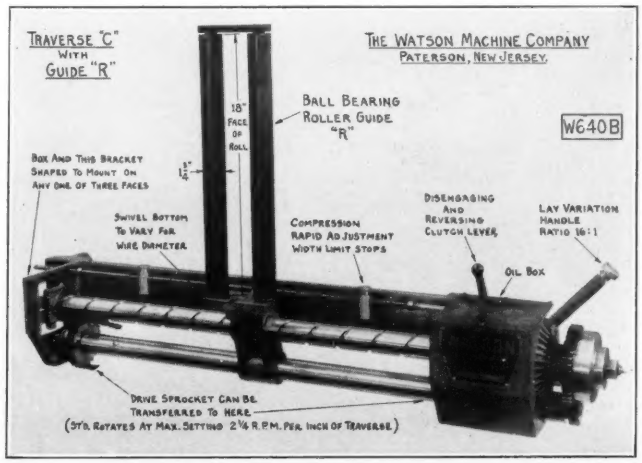
On operations, such as saturating, where high rate of traverse is present, the shock absorbing mechanism eliminates rapid wear of parts, due to shock.

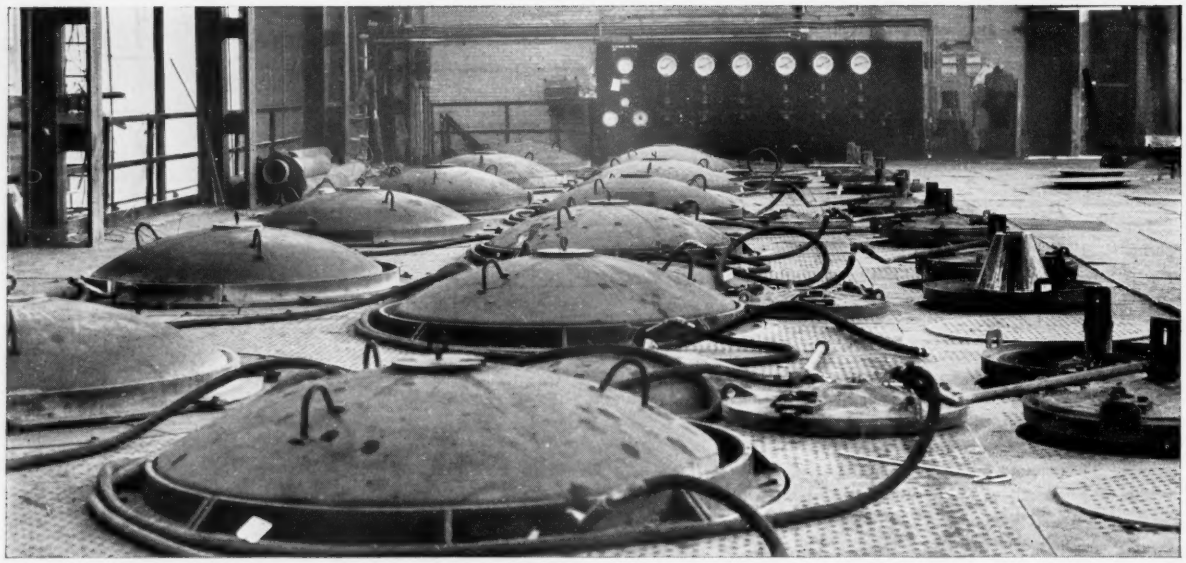
The Box and End Frame can be mounted on any of their three sides. Unit can be placed on top of "A" Frames, if Takeup Frames are not suitable for reception.

The installation of this unit on existing Takeup is easily accomplished.

In ordering it is essential that the direction of rotation of the sprocket driven shaft be given.

This unit is used by us on Gang Winders for spools up to 16″ diameter.


TRAVERSE "C" WITH GUIDE "R"
THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
18" FACE OF ROLL
BALL BEARING ROLLER GUIDE "R"
W640B
BOX AND THIS BRACKET SHAPED TO MOUNT ON ANY ONE OF THREE FACES
1 1/4"
SWIVEL BOTTOM TO VARY FOR WIRE DIAMETER
COMPRESSION RAPID ADJUSTMENT WIDTH LIMIT STOPS
DISENGAGING AND REVERSING CLUTCH LEVER
LAY VARIATION HANDLE RATIO 16:1
OIL BOX
DRIVE SPROCKET CAN BE TRANSFERRED TO HERE.
(STD. ROTATES AT MAX. SETTING 2 1/4 R.P.M. PER INCH OF TRAVERSE.)



6 More PIT TYPE Furnaces For Normalizing Rod

The above installation—another repeat order—is one of several pit type furnace installations recently completed, or now under construction for normalizing rod and bright annealing steel wire.

Recently we have been favored with repeat orders from several of the most prominent rod and wire mills in the country for these pit type annealers and normalizers.

These repeat orders include additional furnaces ranging from one to six per installation. Some are for annealing wire only, some for normalizing and spheroidizing rod and others are to be arranged for handling both rod and wire in the same equipment.

These furnaces are fired with coke oven gas, mixed gases, natural gas or fuel oil.

All are being arranged for use with Elfurno controlled atmosphere because surface condition is becoming so increasingly important.

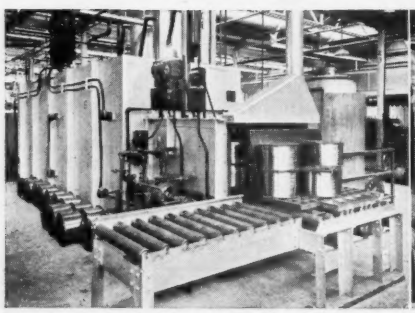
These repeat orders—from users with one and two or more years experience in the operation of the original installation—would seem to indicate that the original furnaces have given satisfactory service and confirm our claim that "these furnaces turn out the most tonnage at the lowest cost with the most satisfactory surface condition obtainable and with the greatest flexibility of operation."

Other recent installations include furnaces for bright annealing copper wire, steel and copper tubing, strip, stampings, clean annealing brass wire, scale free hardening bolts, springs and miscellaneous products, as well as furnaces for billet heating, carburizing, copper brazing and other heating and heat treating processes.

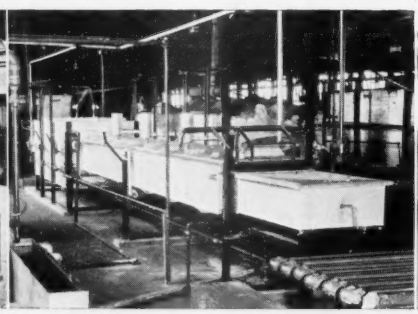
Additional information on these pit type annealers and normalizers or on any other types of furnaces gladly furnished on request.

The Electric Furnace Co., Salem, O.

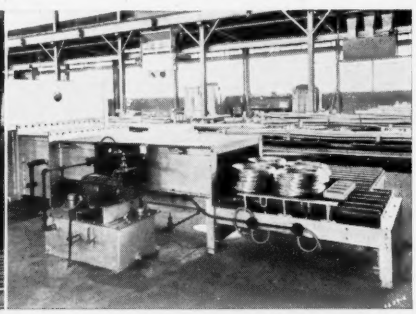
We Build the Furnace to Fit Your Job — For Oil, Gas or Electric Heat.



Bright Annealing copper wire on reels and in coils —continuously.



Bright Annealing fine copper wire on spools — continuously.



Bright Annealing phosphor bronze, brass and nickel-silver wire — continuously.